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The Holy Quran and The Sciences of Nature

by:
Dr. Mehdi Golshani

Islamic Propagation Organization
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and
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PUBLISHER'S NOTE

The Holy Quran — the last Heavenly Book which came in the form of revelations from Allah to His Prophet of Islam (S.A.)— Contains diverse fields of the knowledge and every expert can find best possible scientific facts on his field of specialisation in this Holy Book and can acquaint himself with the real secrets of his specialised field.

The secrets of nature have been the man's centre of attention and study from the time immemoriai and this has been the main motivation force for the intellectuals, Ulama and learned people that many of these secrets could be discovered by now.

The Holy Quran is a fervent and abundant source of knowledge and brings out very vital and interesting facts about the secrets of nature. It would suffice if someone studies in depth and with specific insight the relevant verses of Quran and comes to know about Allah's philosophy in creation of the Universe.

The present book is one of the valuable works which deals with this subject. It has been written by one of the noted university professors and it is now being published and distributed by the International Relations Department of the Islamic Propagation Organisation for the benefit of various scientists, thinkers, Ulama and experts.

It is hoped that the experts, scientists, thinkers and professors of different fields from all over the world, and from the Islamic Universities in particular would study this comprehensive and creative book and would infinitely benefit from this source.

International Relations Department
Islamic Propagation Organisation, Tehran

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PREFACE

The three essays assembled here are based on lectures delivered by the author on three different occasions. They are united in that they all concern the Holy Quran and the sciences of nature.

The first essay deals with the Islamic conception of knowledge. There I have tried to show that Islam's recommendation for the acquisation of knowledge is not restricted to the particular teachings of Shariah, but it applies to any kind of knowledge that is instrumental in bringing us closer to God. All sciences, whether theological or physical are means for obtaining proximity to God, and, as long as they play this role, they are sacred.

In the second essay, I have tried to spell out the reasons for the desirability of the physical and natural sciences in Islamic outlook. There, we find two fundamental reasons for the significance of these sciences in Islamic world-view:

1. The role of these sciences in knowing God.
2. The role of these sciences in the stability and glorification of the Muslim Ummah.

The third essay deals with some basic problems of epistemology from the Quranic view-point. This is an area in which very little work is done, and here our concern is to stimulate Muslim scholars to spend more time and energy on this subject of fundamental importance.

I hope and pray that these essays may be a humble aid in stimulating further research in this area, in the revival of scientific spirit in the Ummah, and in promoting scientific knowledge in the Muslim world.

Mehdi Golshani

PART 1

SCIENCE AND THE MUSLIM UMMAH

Islamic Conception of Knowledge

One of the distinctive features of Islam is its emphasis on knowledge. The Quran and the Islamic tradition **(sunnah)** invite Muslims to seek and acquire knowledge and wisdom and to hold men of knowledge in high esteem. Some of the Quranic verses and relevant traditions will be mentioned in the course of our discussion.

At the outset we may recall a famous **hadith** of the Holy Prophet—upon whom be Allah's peace and benedictions—that has come down through various sources; it says:

«طلب العلم فريضة على كل مسلم.»[1]

"Acquisition of knowledge is incumbent on every Muslim."

This tradition brought up the discussion as to what kind of knowledge a Muslim should necessarily acquire—an issue around which various opinions were offered in the past.

Abu Hamid Al-Ghazzali (died A.D. 1111), in his famous book **Ihya 'Ulum al-din** (The Revival of Religious Sciences), mentions that he had come across twenty different answers to the above question[2]. The theologians considered that the learning of Islamic theology **(kalam)** was an obligation, while the jurisprudents **(fuqaha')** thought that Islamic jurisprudence **(fiqh)** was implied in the prophetic tradition. Al-Ghazzali himself favoured the view that the knowledge

whose acquisition is a religious obligation is limited to what one must know for correct performance of the acts obligatory for a person within the framework of the Islamic **Shari'ah.**[3] For instance, one whose occupation is animal husbandry should acquaint himself with the rules concerning **zakat.** If one were a merchant doing business in an usurious environment, he ought to be aware of the religious injunction against usury **(riba)** so as to be able to effectively avoid it.

Al-Ghazzali then proceeds to discuss sciences whose knowledge is **wajib kifa'i**[4] (something which is obligatory for the whole society as long as the duty for fulfillment of a social need exists, but as soon as the duty is shouldered by enough number of individuals, others are automatically relieved of the obligation). Subsequently, he classifies all knowledge into "religious" and "non-religious" sciences. By "religious sciences" **('ulum al-shar')** he means the bulk of knowledge imparted through the prophetic teachings and the Revelation. The rest constitute the "non-religious" sciences. The non-religious sciences are further classified into "praiseworthy" **(mahmud),** "permissible" **(mubah)** and "undesirable" ones **(madhmum).** He puts history in the category of permissible sciences **(mubah)** and magic and sorcery in the category of the undesirable fields of "knowledge". The "praiseworthy" sciences **(mahmud),** whose knowledge is necessary in the affairs of life are **wajib kifa'i;** the rest of them bring additional merit to the learned who pursue them. He puts medicine, mathematics and crafts, whose sufficient knowledge is needed by the society, in the category of sciences which are **wajib kifa'i.** Any further research into the detail and depth of problems of medical science or mathematics is put by Al-Ghazzali in the second category which involves merit for the scholar without entailing any manner of obligation.

Al-Ghazzali classifies the religious sciences also into two groups:praiseworthy**(mahmud)** and undesirable **(madhmūm).** By "undesirable religious sciences" he means those which are apparently oriented towards the Shari'ah but actually deviate from its teachings. He subdivides the "praiseworthy

"religious sciences"[15] into four groups:

1- **Usul** (principles; i.e. the Quran, the **sunnah, ijma** or consensus and the traditions of the Prophet's companions)

2- **Furu'** (secondary or derived matters; i.e. problems of jurisprudence, ethics and mystical experience)

3- **Introductory studies** (Arabic grammar, syntax, etc.)

4. **Complementary studies** (recitation and interpretation of the Quran, study of the principles of jurisprudence, **'ilm al-rijal** or biographical research about narrators of the Islamic traditions etc.)

Al-Ghazzali considers the knowledge of the disciplines contained in the above four groups to be **wajib kifa'i.**

As to the extent to which one should learn the "praiseworthy" sciences, Al-Ghazzali's view is that in matters of theology such as knowledge of God, Divine qualities, acts and commands, one should try to learn as much as is possible. However, as to religious topics whose knowledge is wajib kifa'i, one should learn as much as is sufficient. Here the summary of his views is that one should not pursue learning of those sciences if there are already others devoting themselves to their study, and if one were to do so, he should refrain from spending all his life for their learning, "for knowledge is vast and life is short. They are preliminaries and not the end in themselves."[5]

As to theology **(kalam),** his opinion is that only as much of it as is corroborated by the Quran and **hadith** is beneficial. Moreover, he says, "now that the heretics attempt to induce doubts (in the minds of unsophisticated believers), adequate knowledge of theology is necessary to confront them."

Regarding philosophy, Al-Ghazzali thinks that it is distinguishable into four parts:[6]

1- Aritmethic and Geometry, which are legitimate and permissible.

2- Logic, which is a part of theology.

3- Divinities, which discusses Divine Essence and Attributes and is also a part of theology.

4- Physics, which may be divided into two sections: One part which involves discussions opposed to the **Shari'ah** and accordingly cannot even be considered a "science"; the other part discusses the qualities of bodies. The second part is similar to the science of medicine, although medicine is preferable to it. This section of physics is useless while medicine is useful.

Mulla Muhsin Fayd al-Kashani, in his book **Mahajjat al-bayda**[7], says:

"It is a personal obligation**(wajib 'ayni)**of every Muslim to learn Islamic jurisprudence to the extent of his needs. Further, learning of **fiqh** to fulfil the need of others is **wajib kifa'i** for him."

Regarding philosophy, Kashani says:[8]

"The components of philosophy are not the only ones distinguished by Abu Hamid (Al-Ghazzali)—upon whom be God's mercy. Philosophy covers many other fields of religious and mundane matters (for example astronomy, medicine and rhetoric etc.) ...Whatever of these sciences that is about the Hereafter exists to the point of perfection in the **Shari'ah,** and that which is not useful for the Hereafter is not needed; moreover, it may even hinder the pursuit of the path of Allah. In the case of those portions which are effective for the knowledge of the Divine but are not elaborated by the **Shari'ah** (like astronomy), it is sufficient to be satisfied with the simple unelaborated discussions of the **Shari'ah** about such matters."[9]

In brief, in Kashani's opinion anyone who wishes to learn these sciences should first acquaint himself with the religious sciences.

Sadr al-Din Shirazi (Mulla Sadra) in his commentary on **Usul al-Kafi** regards Al-Ghazzali's limitation of obligatory knowledge for a Muslim to the matters of ritual practice and legitimate dealings as unacceptable.[10] In his opinion, learning of religious sciences (such as **tawhid,** Divine attributes and acts) and human sciences (such as dispositions of the soul, its delights and afflictions) are also obligatory for the majority

of human beings. Secondly, he believes that it is not at all essential that what is obligatory **(wajib 'ayni)** for all to learn should apply identically in case of every individual and what is obligatory for one individual be regarded as being equally obligatory for another.

Here, it seems appropriate to mention a few points discussed by Sadr-al-Din Shirazi in his commentary on Usul-al-Kafi in relation to the tradition:

«طلب العلم فريضة على كل مسلم».

"Acquisition of knowledge is incumbent on every Muslim."

1- The word **'ilm** (knowledge or science), like the word "existence" **(wujud)** has a broad range of meanings which vary from the viewpoints of strength or weakness, perfection or deficiency.[1] The word's generic sense covers this whole spectrum of meanings in which it has been used in the prophetic tradition. This broad sense of the word **'ilm** is common to all its varied meanings. Accordingly, the tradition intends to state that at whatever stage of knowledge one may be,he should strive to make further advance. The Prophet means that acquisition of knowledge is obligatory for all Muslims, scholars as well as ignorant men, beginners as well as learned scholars. Whatever stage of knowledge man may attain, he is still like a child entering into adulthood i.e. he should learn things which were not obligatory for him earlier.

2- The tradition implies that a Muslim can never be relieved of his responsibility of acquiring knowledge.[12]

3- No field of knowledge or science is undesirable or detestable in itself; for knowledge is like light and so it is always desirable. The reason that some of the sciences have been regarded as "undesirable" is because of the undesirable effects they produce.[13]

Here we do not intend to enter into a discussion about sciences whose learning is obligatory **(wajib 'ayni)** for every responsible (mukallaf) Muslim individual. Rather, we

propose to discuss those sciences whose knowledge is a **wajib kifa'i** for all the Muslim Ummah. However, before we start to discuss the latter group, it seems fruitful to mention briefly our view about the former group (i.e. wajib 'ayni group). Our view in this matter is the same as that of 'Allamah Fayd Kashani, as expressed in his book **"al-wafi"**:

"The knowledge which is incumbent on every Muslim to acquire is the one that elevates man's position in the next world, and that which brings him the knowledge of his self, his Creator, prophets, messengers of God, elite of Islam, signs of God, doomsday, and whatever causes proximity of God or divergence from the Almighty's way. The levels of acquisition of this knowledge differ from person to person in accordance with their talents, and even in the case of a particular person, the level of attainment changes with his evolution. Therefore, there is no limit to the acquisition of this type of knowledge, and no matter what level one reaches, it is still incumbent on him to attain a higher level (this of course depends on his capacity and patience too)."

In the case of the sciences which belong to the category of **"Wajib-Kifa'i"**, we find some of the views of Imam Ghazzali and 'Allamah Kashani disputable:

1- We do not approve of their classification of sciences into "religious" and "non-religious". As the Martyr Professor Murteda Mutahhari has rightly pointed out, such classifications may entail the mis-conception that the "non-religious" sciences are alien to Islam, and this seems incompatible with the universality of Islam-the religion which claims to bestow full felicity upon mankind. A religion that considers itself self-sufficing cannot estrange itself from the issues which play a vital role in securing welfare and independence for the Islamic society. According to the late Mutahhari:

"Islam's comprehensiveness and finality as a religion demands that every field of knowledge that is beneficial for an Islamic society be regarded as a part and parcel of the "religious sciences."[15]

Besides, we think that the group of sciences belonging to the category of **wajib kifa'i** is much larger than what Al-Ghazzali would have us believe. Moreover, we think that the parsimony he shows regarding those sciences which may be included in this category, does not harmonize with the teachings of the Quran and the Islamic **sunnah.** Our reasons for not accepting such restrictions on learning are as follows:

1- In most of the Quranic verses and the Islamic traditions, the concept of **'ilm** (knowledge) appears in its absolutely general sense, as can be seen from examples given below:

«قُلْ هَلْ يَسْتَوِي الَّذِينَ يَعْلَمُونَ وَالَّذِينَ لا يَعْلَمُونَ» (الزمر/٩)

Say: Are those who know and those who do not know a like? (39:9)

«عَلَّمَ الإِنْسانَ مالَمْ يَعْلَمْ» (العلق/٥)

(God) taught man what he knew not. (96:5)

«وَعَلَّمَ آدَمَ الأَسْماءَ كُلَّها ثُمَّ عَرَضَهُمْ عَلَى الْمَلائِكَةِ فَقالَ أَنْبِئُونِي بِأَسْماءِ هؤُلاءِ إِنْ كُنْتُمْ صادِقِينَ» (البقرة/٣١)

And He taught Adam all the names; then showed them to the angels, saying: "Tell me the names of these, if you are right." (2:31)

«وفوق كل ذى علم علیم» (یوسف/٧٦)

"... and above everyone possessed of knowledge is the All-knowing one." (12:76)

«... ومنكم من يرد الى ارذل العمر لكى لا يعلم بعد علم شيئاً» (النحل/٧٠)

"... and of you is he who is brought back to the worst part of life, so that after having knowledge he does not know anything..." (16:70)

The Prophet's tradition:

«من سلك طريقاً يطلب فيه علماً سهّل الله له طريقاً الى الجنة»

"Anyone who pursues a course in search of knowledge, God will ease his way to paradise."[17]

2) Some Quranic verses and the Prophet's traditions are explicit in pointing out that knowledge does not mean only learning the principles and laws of religion. As examples, we cite some of them here:

«وَلَقَدْ ءاتَيْنا داوُدَ وَ سُلَيْمانَ عِلْماً، وَقالا اَلْحَمْدُ لِلّهِ الَّذي فَضَّلَنا عَلَىٰ كَثيرٍ مِنْ عِبادِهِ الْمُؤْمِنينَ، وَوَرِثَ سُلَيْمانُ داوُدَ، وَقالَ يا أَيُّها النّاسُ عُلِّمْنا مَنْطِقَ الطَّيْرِ، وَ أُوتينا مِنْ كُلِّ شَيْءٍ، إِنَّ هٰذا لَهُوَ الْفَضْلُ الْمُبينُ» (النمل/١٥—١٦)

a) *"And certainly We gave knowledge to Dawud and Sulayman, and they both said: Praise be to Allah, who has made us to excel many of His believing servants. And Sulayman was Dawud's heir, and he said: o men! we have been taught the language of birds, and we have been given all things: most surely this is manifest grace." (27:15-16)*

We see that Solomon considers knowing the language of birds as a Divine blessing or grace.

«أَلَمْ تَرَ أَنَّ اللّهَ أَنْزَلَ مِنَ السَّماءِ ماءً فَأَخْرَجْنا بِهِ ثَمَراتٍ مُخْتَلِفاً أَلْوانُها وَمِنَ الجِبالِ جُدَدٌ بيضٌ وَحُمْرٌ مُخْتَلِفٌ أَلْوانُها وَ غَرابيبُ سُودٌ * وَمِنَ النّاسِ وَالدَّوابِّ وَالأَنْعامِ مُخْتَلِفٌ أَلْوانُهُ كَذٰلِكَ إِنَّما يَخْشَى اللّهَ مِنْ عِبادِهِ الْعُلَماءُ إِنَّ اللّهَ عَزيزٌ غَفُورٌ. (فاطر / ٢٧—٢٨)

b) *Do you not see that God sends down water from the sky, then We bring forth with it fruits of various colours, and in the mountains are streaks, white and red and of various colours and others intensely black? And of men and beasts and cattle are of various colours likewise; only those of His servants endowed with knowledge fear God; surely, God is Almighty and Forgiving. (35:27-28)*

Clearly the word 'Ulama (possessors of knowledge) in the above verse refers to those who, being aware of the laws of nature and mysteries of creation, bow humbly to the grandeur and majesty of God.

«وما علمناه الشعر...» (يس/٦٩)

c) *"And We have not taught him poetry." (36:69)*
d) In the Quran, there is a reference to Qaroun as saying:

«قال انما اوتيته على علم عندى...» (القصص/٧٨)

"He said: I have been given this only on account of the knowledge I have." (28:78)

e) Traditions of the following kind:

«اطلبوا العلم ولو بالصين، فان طلب العلم فريضة على كل مسلم»

"Seek knowledge by even going to China, for seeking knowledge is incumbent on every Muslim."[18]

«اعلم الناس من جمع علم الناس الى علمه.... واكثر الناس قيمة اكثرهم علماً واقل الناس قيمة اقلهم علماً».

"The most learned of men is the one who gathers knowledge from others on his own; the most worthy of men is the most knowing and the meanest is the most ignorant."[19]

«الحكمة ضالّة المؤمن فحيث وجدها فهو احق بها»

"Wisdom is the believer's lost property therefore, wherever he finds it, he deserves more than anyoneelse to have it."[20]

The above-mentioned traditions have been reported from the Holy Prophet (S) and narrations such as the following are reported from Imam ʿAli (A.S):

«الحكمة ضالّة المؤمن فاطلبوها ولو عند المشرك، تكونوا احق بها واهلها»

"Wisdom is the lost property of believers, then seek it even if it

be with polytheists, because you deserve to have it more than they do.[21]

«خذ الحكمة ممن اتاك بها وانظر الى ما قال ولا تنظر الى من قال»

"Grasp wisdom from whoever offers it to you, see **what** is said not **who** says it." (22)

All these sayings indicate that acquisition of knowledge is not confined to learning the principles and laws of religion, because it is quite obvious that China in those days was not the center of theological studies, but it was famous for its industry. Moreover, it is clear that the laws and principles of Islam could not be learnt from atheists or polytheists.

2- Another reason for believing that 'desirable' knowledge is not confined to theological studies or the Shari'ah laws dealing with permissible and forbidden is the invaluable heritage itself left by Muslim scholars of the first few centuries after Hijrah. It is also confirmed by contemporary historians that Muslim scholars have been the torch bearers of science for many centuries, and their works were used as text books in Europe for several hundred years. In fact, a major reason why Muslim scholars assimilated the scientific heritage of other nations was that they did not see any conflict between the goals of science and religion, and were convinced that both religion and science aimed to demonstrate the unity of nature which in turn is an indication of the Unity of its Creator. It was for this very reason that theology and rational and physical sciences made up a conjoint discipline to be taught in theological schools and mosques.

3- To set aside a group of sciences on the pretext that they do not have as much value as the religious studies is not correct. Because, whatever field of knowledge is conducive to preservation of the strength and vitality of an Islamic society, its knowledge is **wajib kifa'i** in the same fashion as scholarship in religious sciences has been pointed out as a **wajib kifa'i** for the Islamic society in the following verse of the Quran:

«وما كانَ المُـؤمِنُونَ لِيَنفِرُوا كافةً فَلَوْلاَ نَفَرَمِنْ كُلِّ فِرْقَةٍ مِنْهُمْ طائِفَةٌ لِيَتَفَقَّهُوا فِي الدِّينِ وَ لِيُنْذِرُوا قَوْمَهُمْ إذا رجعوا إلَيْهِمْ لَعَلَّهُمْ يَحْذَرون» (التوبة/١٢٢)

"It is not for the believers to go forth totally (to acquire scholarship in religion); but why should not a party of every section of them go forth, to become learned in religion, and to warn their people when they return to them that haply they may beware? (9:122)

Hence we may conclude that the word **'ilm** as it occurs in the Quran and Sunnah appears in its generic sense rather than referring exclusively to religious studies. On this ground it can be said Islam has only dissuaded Muslims from preoccupying themselves with any pursuit of such branches of knowledge whose harm is greater than their benefit (like magic and sorcery and games of chance used for gambling). The relevant sayings of the Prophet (S) may be noted:

«خيرالعلم ما نفع»

"The best fields of knowledge are those which bring benefit."[23]

«اللّهم انفعنى بما علّمنى وعلّمنى ما ينفعنى وزدنى علماً»

O God! Benefit me through knowledge that You have bestowed on me, teach me whatever would benefit me, and increase my knowledge."[24]

'Ali (A) is related as having said:

«لاخير فى علم لاينفع»

There is no good in knowledge which does not benefit.[25]

«العلم اكثر من ان يحاط به، فخذوا من كل علم أحسنه»

Knowledge is too immense in scope for anyone to be able to learn

all of it. So learn from each science its useful parts.[26]

There is no division of opinion on the necessity of acquiring knowledge relevant to religious studies. Accordingly, we shall abstain from any further discussion of the subject.[27] Instead, it is worthwhile to concentrate on the question of necessity of learning other sciences in the view of the Quran and **sunnah.** In this regard there are a number of arguments which we shall take up immediately.

1- If knowledge of a science is a prerequisite to the attainment of Islamic goal as envisaged by the **Shari'ah,** its pursuit is an obligation **(wajib)** since it entails the preliminary condition for fulfillment of a duty prescribed by the **Shari'ah.** For example, the physical welfare of individuals in an Islamic society is necessary, hence it is a **wajib kifa'i** for the Muslims to study medicine.

Some are of the opinion that in this context the duty to learn any specific science depends on the need of the society for it. For example, in our day, in order to succeed in large-scale agriculture or commerce, specialized knowledge of these subjects is necessary. Accordingly, it is a **wajib kifa'i** for Muslims to specialize in these fields.

Evidently, if Muslims are to restrict their learnings to what has already been established in other countries, in other words, to be satisfied with the minimum of their scientific requirements, they will never be able to beat the non-Muslim world in scientific progress.

2- The society envisioned by the Quran is an independent society of majesty and grandeur, not one subservient to and dependent on the unbelievers, as can be seen from this verse of the Quran:

«... وَلَنْ يَجعَلَ اللهُ لِلكافِرِينَ عَلَى المُؤمِنِينَ سَبِيلاً» (النساء/١٤١)

"...and Allah does not grant the unbelievers any way (of domination) over the believers."(4:141)

In order to realize this goal set by the Quran, it is

essential that the Islamic society should have cultural, political and economic independence; this in turn necessitates training of specialists of high calibre in every field and creation of the necessary scientific and technical facilities in Islamic societies. It is clear that one of the reasons of decline of Muslim societies in the recent centuries is that they left the study of those sciences to others which they themselves deserved to study most, and made themselves dependent on others.

Should not the Muslims equip themselves in every way to defend themselves against the non-believers as stressed by the following verse?

«وأعِدُّوا لَهُمْ مَا اسْتَطَعْتُمْ مِنْ قُوَّةٍ وَمِنْ رِبَاطِ الْخَيْلِ تُرْهِبُونَ بِهِ عَدُوَّاللَّهِ وَعَدُوَّكُمْ...»

(الأنفال/٦٠)

"And prepare against them what force you can...so that you may dismay the enemy of God and your enemy and others beside them whom you know not; God knows them. Whatever you spend in the way of God it will be repaid to you in full, and you will not be cheated." (8:60)

And is it not true that in our world today, possession of defence equipments to face the enemies of Islam requires all kinds of scientific and technical know-how? Then why don't the Muslims give the necessary attention to the issue of preparing themselves adequately for their self-defence?

In the modern age, human life is inextricably linked with the effort for scientific advancement and the key to success in all affairs lies in knowledge. It is, therefore, an obligation of Muslim scholars and researchers, living in the countries of either the Eastern or Western block and are engaged in education, to acquire the latest and most complete scientific and technical knowledge. Otherwise their societies will inevitably remain under the domination of one superpower or another. Imam Ja'jar al-Sadiq (A) says:

"A man who is abreast of his time will not be overwhelmed by unexpected problems."[28]

To sum up, if the Muslims want to succeed in their struggle against the evil powers of this age, they should equip themselves with the essentials of scientific advancement and endeavour to make up their lag in scientific and technical fields. Whatever subject is essential for safeguarding the existence and vitality of the Islamic societies should be learnt.

3- The Holy Quran invites mankind to study the system and scheme of creation, the wonders of nature and the causes and effects of all things that exist, the conditions of living organisms, and in short all signs of God discernable in the external universe and the inner depths of the human soul. The Quran enjoins thought and meditation on all aspects of creation and requires human beings to apply their reason and faculties to the discovery of the secrets of nature. We shall quote here a few verses:

«أَفَلَمْ يَنْظُرُوا إِلَى السَّمَاءِ فَوْقَهُمْ كَيْفَ بَنَيْنَاهَا وَزَيَّنَّاهَا وَمَالَهَا مِنْ فُرُوجٍ. وَالْأَرْضَ مَدَدْنَاهَا وَأَلْقَيْنَا فِيهَا رَوَاسِيَ وَأَنْبَتْنَا فِيهَا مِنْ كُلِّ زَوْجٍ بَهِيجٍ. تَبْصِرَةً وَذِكْرَىٰ لِكُلِّ عَبْدٍ مُنِيبٍ»
(ق/٦—٨)

"What,have they not beheld heaven above them,how We have built it, and decked it out fair, and it has no cracks? And the earth–We stretched it forth, and cast on it firm mountains, and We caused to grow therein of every joyous kind for an insight and a reminder to every penitent servant." (50:6-8)

«أَفَلَا يَنْظُرُونَ إِلَى الْإِبِلِ كَيْفَ خُلِقَتْ. وَإِلَى السَّمَاءِ كَيْفَ رُفِعَتْ وَإِلَى الْجِبَالِ كَيْفَ نُصِبَتْ وَإِلَى الْأَرْضِ كَيْفَ سُطِحَتْ» (الغاشية/١٨—٢٠)

"What,do they not consider how the camel was created, how heaven was lifted up, how the mountains were hoisted, how the earth was outstretched?" (88:18-21)

«قُلْ سِيرُوا فِي الأَرْضِ فَانْظُرُوا كَيْفَ بَدَأَ الخَلقَ ثُمَّ اللهُ يُنْشِئُ النَّشْأَةَ الآخِرَةَ إِنَّ اللهَ عَلَى كُلِّ شَيْءٍ قَدِيرٌ» (العنكبوت/٢٠)

"Say: Journey in the land, then behold how He originated creation; then God causes the second growth; God is powerful over everything." (29:20)

«وَفِي الأَرْضِ ايَاتٌ لِلْمُوقِنِينَ. وَفِي أَنْفُسِكُمْ أَفَلا تُبْصِرُونَ» (الذاريات/٢٠ــ٢١)

"In the earth are signs for those having sure faith; and in yourselves; what, do you not see?" (51:20-21)

«إِنَّ فِي خَلْقِ السَّمٰوَاتِ وَالأَرْضِ وَاخْتِلافِ اللَّيْلِ وَالنَّهارِ لايات لأُولِي الألباب. ألَّذِينَ يَذْكُرُونَ اللهَ قِياماً وَقعوداً وَعَلَى جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلقِ السَّمٰوَاتِ وَالأَرْضِ رَبَّنا ما خَلقْتَ هٰذا باطِلاً سُبْحانَكَ فَقِنا عَذابَ النَّارِ» (آل عمران/١٩٠ــ١٩١)

"Surely in the creation of the heavens and the earth and in the alternation of the night and day there are signs for men possessed of minds who remember God, standing and sitting and on their side, and reflect upon the creation of the heavens and the earth: 'O Lord, Thou hast not created this out of falsehood. Glory be to Thee! Guard us against the chastisement of the Fire." (3:190-191)

«إِنَّ فِي خَلْقِ السَّمٰوَاتِ وَالأَرْضِ وَاخْتِلافِ اللَّيْلِ وَالنَّهارِ وَالْفُلْكِ الَّتِي تَجْرِي فِي البَحْرِ بِما يَنْفَعُ النَّاسَ وَما أَنْزَلَ اللهُ مِنَ السَّماءِ مِنْ ماءٍ فَأَحْيا بِهِ الأَرْضَ بَعْدَ مَوْتِها وَبَثَّ فِيها مِنْ كُلِّ دابَّةٍ وَ تَصْرِيفِ الرِّياحِ وَالسَّحابِ المُسَخَّرِ بَيْنَ السَّماءِ وَالأَرْضِ لآيات لِقَوْمٍ يَعْقِلُونَ» (البقرة/١٦٤)

"Surely in the creation of the heavens and the earth and the alternation of night and day and the ship that runs in the sea with profit to men, and the water God sends down from heaven therewith reviving the earth after it is dead and His scattering abroad in it all manner of crawling thing, and the turning about of the winds and clouds compelled between heaven and

earth–surely there are signs for a people having understanding." (2:164)

As can be seen from the foregoing verses, God refers to all existing things in the universe as the "signs" of their Creator, and the system of the universe as the imprint of an omniscient designer and programmer. The study of the universe and what exists in it is considered one of the most important means for knowledge of God and recognition of the majesty of its Creator. Prophets also based their invitation to belief on this point.The Prophet Moses (A.S) makes a similar argument in his confrontation with Pharaoh. The Quran quotes Moses as putting his argument in these words:

«قالَ رَبُّنا الَّذي أَعْطىٰ كُلَّ شيء خَلْقَهُ ثُمَّ هَدىٰ... الَّذي جَعَلَ لَكُمُ الأَرْضَ مَهْداً وَسَلَكَ لَكُمْ فيها سُبُلاً وَ أَنْزَلَ مِنَ السَّماء ماءً فَأَخْرَجْنا بِهِ أَزْواجاً مِنْ نَباتٍ شَتّىٰ» (طه/٥٠ــ٥٣)

"He said, 'Our Lord is He who gave everything its creation, then guided it... He who appointed the earth to be a cradle for you, and therein threaded roads for you and sent down water out of heaven, and therewith We have brought forth diverse kinds of plants." (20:50-53)

Prophet Noah (A.S.) is quoted in the Quran as saying to his people:

«قالَ رَبِّ إِنّي دَعَوتُ قَوْمي لَيلاً وَنَهاراً. فَلَمْ يَزِدْهُمْ دُعائي إِلّا فِراراً... فَقُلْتُ اسْتَغْفِرُوا رَبَّكُمْ إِنَّهُ كانَ غَفّاراً... أَلَمْ تَرَوا كَيْفَ خَلَقَ اللّهُ سَبْعَ سَمٰواتٍ طِباقاً. وَجَعَلَ الْقَمَرَ فيهِنَّ نُوراً وَجَعَلَ الشَّمْسَ سِراجاً. وَاللّهُ أَنْبَتَكُمْ مِنَ الأَرْضِ نَباتاً. ثُمَّ يُعيدُكُمْ فيها وَيُخْرِجُكُمْ إِخْراجاً. واللّهُ جَعَلَ لَكُمُ الأَرْضَ بِساطاً. لِتَسْلُكُوا مِنْها سُبُلاً فِجاجاً». (نوح/٥ــ٢٠)

"He said, "My Lord, I have called my people by night and by day, but my calling has only increased them in flight... and I said,'Ask you forgiveness of your Lord;surely He is ever All-forgiving... What ails you, that you look not for majesty in God,

seeing He created you by stages? Have you not regarded how God created seven heavens one upon another, and set the moon therein for a light and the sun for a lamp?And God causes you to grow out of the earth, then He shall return you into it, and bring you forth. And God has laid the earth for you as a carpet, and thereof you may tread ways, ravines." (71:5-20)

Obviously, it is not for everyone to be able to read the "book" of the universe. The Quran considers only men of knowledge to be capable of benefiting from the book of nature as can be seen from the following verse:

«أَلَمْ تَرَ أَنَّ اللَّهَ أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ ثَمَرَاتٍ مُخْتَلِفاً أَلْوَانُهَا وَمِنَ الْجِبَالِ جُدَدٌ بِيضٌ وَ حُمْرٌ مُخْتَلِفٌ أَلْوَانُهَا وَغَرَابِيبُ سُودٌ وَمِنَ النَّاسِ وَالدَّوَابِّ وَالْأَنْعَامِ مُخْتَلِفٌ أَلْوَانُهُ كَذَلِكَ إِنَّمَا يَخْشَى اللَّهَ مِنْ عِبَادِهِ الْعُلَمَاءُ إِنَّ اللَّهَ عَزِيزٌ غَفُورٌ.» (فاطر/٢٧ـ٢٨)

"Hast thou not seen how that God sends down out of heaven water, and there-with We bring forth fruits of diverse hues? And in the mountains are streaks white and red, of diverse hues, and pitchy black; men too, and beasts and cattle–diverse are their hues. Even so only those of His servants fear God who have knowledge; surely God is Almighty, All-forgiving"(35:27-28)

The Quran regards only men of knowledge as being capable of discerning the majesty and magnificence of God's creation and as possessing the humility produced by their knowledge of Divine power and greatness. This point is stressed in other verses of the Quran:

«وَتِلْكَ الْأَمْثَالُ نَضْرِبُهَا لِلنَّاسِ وَمَا يَعْقِلُهَا إِلَّا الْعَالِمُونَ»

(العنكبوت/٢٩)

"And these similitudes–We strike them for the people, but none understands them save those who know." (29:43)

«بَلْ هُوَ آيَاتٌ بَيِّنَاتٌ فِي صُدُورِ الَّذِينَ أُوتُوا الْعِلْمَ وَمَا يَجْحَدُ بِآيَاتِنَا إِلَّا الظَّالِمُونَ»

"Nay;rather it is signs,clear signs in the breasts of those who have been given knowledge; and none denies Our signs but the evildoers." (29:49)

Obviously, as implied by the abovementioned verses, understanding of the "signs" of the Creator, is considered possible only for the learned and the men of wisdom who have strived to fathom the secrets of nature and have acquired knowledge in their fields of study. Otherwise, only a superficial acquaintance with the "book of creation" is not very revealing. A suitable initiation into this book of nature can only be achieved through such sciences as mathematics, physics, chemistry, astronomy, botany and zoology (which we shall refer to as 'natural sciences'). It is with the aid of these and the rational sciences that we discover the laws of nature and unravel the wonderful order and scheme of creation that underlies nature. It is in this light that we should read the verses of the Quran as the following:

«... فَارْجِعِ الْبَصَرَ هَلْ تَرَىٰ مِنْ فُطُورٍ ۝ ثُمَّ ارْجِعِ الْبَصَرَ كَرَّتَيْنِ يَنْقَلِبْ إِلَيْكَ الْبَصَرُ خَاسِئاً وَهُوَ حَسِيرٌ» (الملك/٣ـ٤)

"Thou seest not in the creation of the All-merciful any imperfection. Return thy gaze; seest thou any fissure? Then return thy gaze, and again, and thy gaze comes back to thee dazzled, aweary." (67:3-4)

It means that the further does human knowledge make progress in understanding God's creation, the more His Greatness and Majesty will become obvious to men. Consider the following verse:

«سَنُرِيهِمْ آيَاتِنَا فِي الْآفَاقِ وَفِي أَنْفُسِهِمْ حَتَّىٰ يَتَبَيَّنَ لَهُمْ أَنَّهُ الْحَقُّ...» (فصلت/٥٣)

"We shall show them Our signs in the horizons and in

themselves, till it is clear to them that He is the truth." (41:53)

In the above verse God promises revelation of His signs in the universe without and the world of spirit within to mankind in future so as to make them convinced that He is indeed the Truth.

4- Another reason for the study of the natural phenomenon and the scheme of creation is that the knowledge of the laws of nature and characteristics of things and organisms can be useful for improvement of conditions of human life. This aspect is emphasized by numerous verses of the Quran, of which we quote a few:

«وَ سَخَّرَ لَكُمُ اللَّيْلَ وَالنَّهارَ وَالشَّمسَ وَالقَمَرَ وَالنُّجُومَ مُسَخَّراتٌ بِأَمْرِهِ إِنَّ فِي ذٰلِكَ لَآيات لِقَومٍ يَعْقِلونَ * وَ ماذَرَأَ لَكُمْ فِي الأَرْضِ مُخْتَلِفاً أَلوانُهُ إِنَّ فِي ذٰلِكَ لَآيَةً لِقَومٍ يَذَّكَّرونَ * وهوالَّذي سَخَّرَ البَحْرَ لِتَأكُلوا مِنْهُ لَحْماً طَرِيّاً وَتَسْتَخْرِجُوا مِنْهُ حِلْيَةً تَلْبَسُونَها وَتَرَى الفُلْكَ مَواخِرَ فِيهِ وَ لِتَبْتَغُوا مِنْ فَضْلِهِ وَلَعَلَّكُمْ تَشْكُرُونَ * وَأَلقَى فِي الأَرضِ رَواسِيَ أَنْ تَمِيدَ بِكُمْ وَأَنْهاراً وَسُبُلاً لَعَلَّكُمْ تَهْتَدُونَ * وَعَلاماتٍ وَبِالنَّجْمِ هُمْ يَهْتَدُونَ» (النحل/١٢ــ١٦)

"And He subjected to you the night and day,and the sun and moon; and the stars are subjected by His command. Surely in that are signs for people who understand. And that which He has multiplied for you in the earth of diverse hues. Surely in that is a sign for a people who remember. It is He who subjected to you the sea, that you may eat of it fresh flesh, and bring forth out of it ornaments for you to wear; and thou mayest see the ships cleaving through it; and that you may seek of His bounty, and so haply you will be thankful. And He cast on the earth firm mountains, lest it shake with you, and rivers and ways; so haply you will be guided; and waymarks; and by the stars they are guided." (16:12-16)

«الم تروا أنَّ الله سخَّر لكم ما في السّموات وما في الأرض وأسبغ عليكم نعمه ظاهرةً وباطنه ومن الناس من يجادل في الله بغير علمٍ ولا هدىً ولا كتاب منيرٍ» (لقمان/٢٠)

"Have you not seen how that God has subjected to you whatsoever is in the heavens and earth, and He has lavished on you His blessings, outward and inward? And among men there is such a one that disputes concerning God without knowledge or guidance, or an illuminating book." (31:20)

«وَسَخَّرَ لَكُمْ ما فِي السَّمٰواتِ وَما فِي الأَرْضِ جَمِيعاً مِنْهُ إِنَّ فِي ذٰلِكَ لَآياتٍ لِقَوْمٍ يَتَفَكَّرُونَ»
(الجاثیه/۱۳)

"And He has subjected to you what is in the heavens and what is in the earth, all together, from Him. Surely in that are signs for a people who reflect." (45:13)

«وَالَّذِي خَلَقَ الأَزْوٰاجَ كُلَّها وَجَعَلَ لَكُمْ مِنَ الفُلْكِ وَالأَنْعامِ ما تَرْكَبُونَ ۞ لِتَسْتَوُوا عَلىٰ ظُهُورِهِ ثُمَّ تَذْكُرُوا نِعْمَةَ رَبِّكُمْ إِذَا اسْتَوَيْتُمْ عَلَيْهِ وَتَقُولُوا سُبْحانَ الَّذِي سَخَّرَ لَنا هٰذا وَما كُنَّا لَهُ مُقْرِنِينَ»
(الزخرف/۱۳)

"He who created the pairs, all of them, and appointed for you ships and cattle such as you ride, that you be seated on their backs and then remember your Lord's blessing when you are seated on them, and say, 'Glory be to Him, who has subjected this to us, and we ourselves were not equal to it.' (43:12-13)

According to the Quran, the study of the book of nature reveals to man its secrets and manifests its underlying coherence, consistency and order. It allows men to use the agency of knowledge to uncover the riches and resources hidden in nature and to achieve material welfare through his scientific discoveries. God has appointed man His vicegerent or deputy upon the earth and provided him with unlimited opportunities. It is for him to recognize his own potentialities and benefit from the opportunities and acquire the power and wisdom befitting his role as a 'deputy' of God and a 'sign' of His wisdom and omnipotence:

«وَهُوَ الَّذِي جَعَلَكُمْ خَلَائِفَ الْأَرْضِ وَرَفَعَ بَعْضَكُمْ فَوْقَ بَعْضٍ دَرَجَاتٍ لِيَبْلُوَكُمْ فِي مَا آتَاكُمْ إِنَّ رَبَّكَ سَرِيعُ الْعِقَابِ وَإِنَّهُ لَغَفُورٌ رَحِيمٌ» (الأنعام/١٦٥)

"It is He who has appointed you viceroys on the earth, and has raised some of you in ranks above others, that He may try you in what He has given you. Indeed your Lord is quite in retribution, and He is Forgiving and Merciful." (6:166)

In fact, this station of being God's viceroy or deput upon the earth has been bestowed upon man as a result of his capacity for acquisition of knowledge as borne out by this verse:

«وَعَلَّمَ آدَمَ الْأَسْمَاءَ كُلَّهَا ثُمَّ عَرَضَهُمْ عَلَى الْمَلَائِكَةِ فَقَالَ أَنْبِئُونِي بِأَسْمَاءِ هَؤُلَاءِ إِنْ كُنْتُمْ صَادِقِينَ» (البقرة/٣١)

"He taught Adam all the names; then presented them to the angels; then He said: 'Tell me the names of those if you are right." (2:31)

So far we have tried to prove that the recommendation of the **Quran** and **'Sunnah'** concerning the acquisition of knowledge is not restricted to the particular teachings of **Shari'ah,** but it equally applies to any knowledge useful for mankind. Now we are going to set the criteria as to what sort of knowledge is useful. To do so, we have to find out and define what the obligation and goal of a Muslim in his earthly life is. The Quran says that all return to the Creator.

«الا الى الله تصير الامور» (الشورى:٥٣)

"...To Allah do all affairs eventually come." (42:53)

And the purpose of the creation of the jinn and human beings is that they worship and seek proximity to the Almighty:

«وما خلقت الجن والانس الاّ ليعبدون» (الذاريات: ٥٦)

"And I have not created the jinn and the men except that they should serve Me." (51:56)

«وان اعبدونى هذا صراط مستقيم» (يس: ٦١)

"And that you should serve Me; this is the right way." (36:61)

وما امروا الاّ ليعبدوا الله مخلصين له الدين...» (البيّنة: ٥)

"And they were not enjoined anything except that they serve Allah, being sincere to Him in obedience." (98:5)

Therefore, the main objective of man should be seeking proximity to God and attaining His consent; and his activities should be focussed in this direction. Anything that brings about this proximity or guides in that direction is praiseworthy. Thus knowledge is useful only if it is an instrument for obtaining knowledge of God, and His pleasure and proximity; otherwise knowledge itself is an inscrutable veil (hijab-e-akbar), whether it is linked with the sciences of nature or the sciences of the Shari'ah. As Saadi has put it:

جز یاد دوست هر چه کنی عمر ضایع است — جز سرّ عشق هر چه بگوئی بطالت است
سعدی بشوی لوح دل از نقش غیر او — علمی که ره بحق ننماید جهالت است

"Life is vain except when recalling Him,
No words are good but (uttering) the secrets of love,
Sadi! Wash of your heart of all but Him, The knowledge not leading to Him is ignorance"

It is obvious that worshipping God is not only through prayers, fasting and so on. In fact, any move in the direction

of proximity to God is considered as worship. One of the means to help man in his way towards God is knowledge, and of course it is only in this case that knowledge can be considered valuable. By the help of knowledge a Muslim can gain proximity to God in various ways and manners .

First of all, he can increase his cognition of God.

Our great Prophet (S) is related as having said:

«ان الله يطاع بالعلم ويعبد بالعلم، وخيرالدنيا والآخرة مع العلم، وشرالدنيا والآخرة مع الجهل»

"God can be worshipped and served by means of knowledge; bliss in this world and Hereafter comes through knowledge;and adversity of this world and Hereafter lies in ignorance."[29]

Secondly, he can effectively help in the advancement of Islamic society and realization of Islamic goals:

"And the word of Allah is the highest". (9:40)

A tradition has been quoted from our great Prophet (S):

«من جاءه الموت وهو يطلب العلم ليحيى به الاسلام كان بينه وبين الانبياء درجة واحدة فى الجنة».

"Should death occur to a man who is learning knowledge with the purpose of reviving Islam, his position in paradise will be (only) one stage below (that of) the prophets."[30]

Thirdly, he can guide other people. It is reported from our dear Prophet (S) as having said:

«قال (ص): رحم الله خلفائى، فقيل ومن خلفاؤك يا رسول الله؟ قال: الذين يحيون سنتى و يعلّمونها عبادالله»

"God will patronize my sucecssors". He was asked, 'Who are your successors?' He answered, 'those who revive my traditions, and teach them to God's servants.'" [31]

Fourthly, he can solve many problems of human society. Our great Prophet (S) is quoted as having said:

«الخلق كلهم عيال الله، فاحب الخلق اليه انفعهم لعياله»

"All people are God's family. Among them, God's favourites are those who are more useful to His family." [32]

The knowledge employed in the above mentioned ways is deemed to be useful; otherwise, it would not have any real value:

«ذلك بان الله هوالحق وان مايدعون من دونه الباطل...»

"This is because Allah is the truth, and that which they callupon besides Him is the falsehood..." (31:30)

Our great Prophet (S) is related as having said:

«من تعلّم علماً لغيرالله وارادبه غيرالله فلتبوأ مقعده من النار»

"He who learns knowledge for other than God, and his aim be other than God, will abide in fire (hell)." [33]

«من ازداد علماً ولم يزدد هدىً لم يزدد من الله الابعدا»

"One whose knowledge increases but his salvation does not keep pace with it, his remoteness from God increases." [34]

«ان الله عزوجل يقول: تذاكر العلم بين عبادي مما تحيى عليه القلوب الميتة اذاهم انتهوا فيه الى امرى»

"God, the Most exalted, has said:'Knowlędgeablediscussions among my servants can enliven their hearts if it leads them towards my commands'." [35]

Any knowledge not helping man on his way to Allah is similar to the load of books carried on the back of a donkey:

«مثل الذين حملوا التوريٰة ثم لم يحملوها كمثل الحمار يحمل اسفاراً» (الجمعة/٥)

"The likeness of those who were charged with the Tawrah, then they did not observe it, is as the likeness of the ass bearing books..." (62:5)

Sayyid Qutb in his commentary on the verse (16:35) makes the following comment:

"In this verse the kind or the subject matter of the knowledge has not been mentioned, for it considers knowledge in general. Moreover, it implies that all kinds of knowledge are considered the gift of God, and any learned man should realise the origin of his knowledge and turn his face towards God to thank Him. He should also utilise it in attaining the consent of God, who has granted him that knowledge. Therefore, knowledge should not stand between man and his Creator, for knowledge is one of God's gifts to man. The knowledge which causes separation between man's heart and God is nothing but aberration and has gone astray from its origin and is oblivious of the destination. It brings happiness neither to its possessor nor to others, and is only the cause of cruelty, fear, anxiety and destruction, because it has gone away from its origin, deviated from its real direction, and has lost its way towards God."[36]

Hence we can infer the following conclusions:

a) All sciences, whether theological or natural are means for obtaining proximity to God, and as long as they play this role, they are sacred. But this sanctity is not intrinsic.

As Martyr Dr. Beheshti puts it:

"Any area of knowledge as long as it does not become an instrument in the hands of **taghut** (non-God or anti-God) is a

means of enlightenment; otnerwise knowledge may also become a means of misguidance."

b) In this perspective, various sciences are not alien to each other; because in their own way they interpret the various pages of the book of creation to us.

As the eminent poet-sage Shaykh Mahmud Shabistari says:

بنزد آنکه جانش در تجلی است
همه عالم کتاب حق تعالی است
از او هر عالمی چون سوره‌ای خاص
یکی زان فاتحه و آن دیگر اخلاص

"To him whose spirit is enlightened,
The entire universe is a sacred book of the Most High;
Every sphere of universe is a different chapter,
One is the Opening Surah, and another the Surah of Ikhlas."

In the pages of this Divine book, some chapters may have precedence and priority over others, but nevertheless, all of them are essential for the appreciation of God's signs in **afaq** (horizons) and **anfus** (souls), that is in the universe without and within.

In the early centuries of Islamic civilization, when it was at its peak, the Muslim intellectuals approached the question of learning with a vision similar to the one discussed above. Different sciences were seen in a single perspective and considered interrelated as branches of the 'tree' of knowledge. The goal of all sciences was seen as discovery of unity and coherence in the world of nature. Accordingly, the

source of all knowledge was considered to be one. They utilized the experimental as well as the intellectual and intuitive approaches for understanding of various levels and stages of existence. During that period we find numerous examples of scholars who combined authority in religious sciences with encyclopedic knowledge of the natural sciences. Men like Ibn Sina, 'Umar Khayyam, Khwajah Nasir al-Din Tusi and Qutb al-Din Shirazi are some names among many. As long as this vision and perspective ruled Muslim scholarship and science, the Muslims were in the vanguard of the human civilization and their cities were centers of specialized learning.

George Sarton admits that during the period between A.D. 750 and 1100, the Muslims were undisputed leaders of the intellectual world and between A.D. 1100 and 1350,the centers of learning in the Muslim world retained their global importance and attraction. After 1350 the European world began to advance and the Islamic world not only became stagnant but also failed to absorb the progress made outside it. The theological schools excluded all natural sciences from their curriculum except classical astronomy and mathematics. This restriction led to grave repercussions for the Islamic world. Here we point out a few of these effects:

1- Whereas the Europeans were striving to unravel the hidden laws of nature and to discover ways of exploiting its treasures and resources, the Muslims set aside these activities, and left to others what they deserved most to handle. Today they have reached the point where they have to depend on America and Europe to satisfy their elementary needs. They remain largely unable to use their resources, which they continue to leave to foreigners to exploit.

2- Those Muslims who pursued the empirical sciences were mostly estranged from the religious sciences. As a result they lacked the Islamic world-outlook which was replaced by the atheistic vision that dominates the Western scientific tradition.

3- The elimination of the study of the natural sciences from the curricula of the religious **madrasahs** and the lack of

direct touch with the sources of modern science on the part of religious scholars gave rise to the two deviated intellectual currents in the Muslim world:

a) Some Muslims, under the influence of Western scientific and technical progress and without any knowledge of the limitations of empirical sciences, became singularly possessed with them... to the extent that they even tried to interpret the Quran and **hadith** according to their conjectures. The Quranic exegeses written by Tantawi and Sir Sayyid Ahmad Khan belong to this class. Others have gone still further claiming that all the finding of the modern sciences are found in the Quran and the texts of Islamic tradition **(hadith).** The claim, supposedly, was aimed at demonstrating the miraculous and Divine nature of the Quran.[17]

In the introduction to his exegesis of the Quran, Shaykh Mahmud Shaltut, the late head of Al-Azhar University, writes: "God did not send down the Quran to inform mankind of scientific theories and technological techniques... If we try to attempt a conciliation between the Quran and tentative scientific hypotheses, we will thereby subject the Quran to reversals of times to which all scientific theories and hypotheses are prone. That would result in presenting the Quran in an apologetic and defensive perspective. Whatever is mentioned in the Quran about the mysteries of creation and natural phenomena is intended to impel mankind to speculation and inquiry into these matters so that thereby their faith in it is enhanced."[18]

b) Some scholars of religion considered scientific theories as opposed to the doctrines of religion and accordingly set out to attack science.This resulted in the repercussion that many Muslims turned away from religion. Had the natural sciences not been exiled from the religious curricula, this tragedy would not have occurred. Any fruitful criticism of ideas based on scientific theories requires, in the first place, familiarity with the various disciplines of modern science, so that any unwarranted conclusions derived from scientific findings may be properly exposed and rejected.

How is it possible to claim that the natural sciences result in man's estrangement from God, when the Quran unambiguously declares:

«إنَّ في خَلْقِ السَّمواتِ والأرْضِ وَاخْتِلافِ آللَّيْلِ والنَّهارِ لآيات لأُولي الألْبابِ. ألَّذينَ يَذْكُرُونَ اللهَ قِـياماً وَقُعُوداً وَعَلىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ في خَلْقِ السَّمواتِ وَالارْضِ رَبَّنا ما خَلَقْتَ هٰذا باطِلاً، سُبْحانَكَ فَقِنا عَذابَ النّارِ» (آل عمران/۱۹۰ــ۱۹۱)

"Surely in the creation of the heavens and earth and in the alternation of night and day there are signs for men possessed of minds who remember God, standing and sitting and on their sides, and reflect upon the creation of the heavens and the earth: 'Our Lord, Thou hast not created this for vanity. Glory be to Thee! Guard us against the chastisement of the Fire.' (3:190-191)

If the line of demarcation between religion and science is made clear, there is no reason for any conflict between these two. In fact they would complement each other. Science is like the lamp of life and religion its guide.

PROPOSALS:

We have seen how Islam has strongly emphasized the need for acquisition of knowledge in its widest sense, and how the Muslims, following the teachings of Islam, created a brilliant civilization and were the leaders of human intellectual advancement for centuries. We also saw how the separation of religion from science in Muslim societies caused the Muslims to abandon their role of intellectual leadership of mankind. But now that the Muslim community is showing gradual reawakening, and a new spirit is resurging in almost every corner of the Muslim world, the time seems most suitable for taking decisive steps towards bringing about a scientific renaissance. In this context, we call the attention of our readers to the following proposals:

1-Like the scholars and scientists of the early centuries of the Islamic era we should learn all useful sciences from others. We can liberate scientific knowledge from its attending Western materialistic interpretations and rehabilitate it in the context of Islamic world-outlook and ideology.

2- The kind of alliance which existed between religious and natural sciences during the peak days of Islamic civilization should be re-established since, as has been pointed out, there is no conflict between the ends of religion and science. Religion teaches that all creation is oriented towards God as stated in the Quranic verse:

«يُسَبِّحُ لِلّهِ ما فِي السَّمٰواتِ وَما فِي الأَرْضِ المَلِكِ القُدُّوسِ العَزِيزِ الحَكِيمِ» (الجمعة/١)

"All that is in the heavens and the earth magnifies God, the Supreme, the All-holy, the Almighty, the All-wise."(62:1)

Science, too, is engaged in an attempt to unravel a comprehensive unity in the laws of nature. The present day physicists are involved in an effort of reducing all apparently independent forces of nature to a single fundamental one and have obtained some success in this field.[39]

For the achievement of this goal,it seems inevitable that the latest scientific principles should be taught in theological centers, and, in the same way, religious sciences should be taught in universities at a comparatively advanced level. This will be instrumental in familiarizing Muslim research scholars with the Islamic world-outlook. Moreover, it would give the opportunity to theological schools to utilise latest scientific findings for clarification of the content of the law of the **Shari'ah.**

3-For the achievement of an all-round independence of the Islamic Ummah,it is essential that all the Muslim countries take steps towards the training of specialists in all important scientific and industrial fields. Moreover, research centers

should be established by all the Muslim communities so that the Muslim researchers can work without any anxieties or problems, and with all necessary facilities for research, so that they are not forced to take refuge in atheistic environments, and as a result compelled to put their expertise in the service of others.

4- Scientific research should be thought of as a fundamentally essential and not an ancillary pursuit. The Muslims should think of it as an obligation imposed upon them by the Quran so that they do not come to rely and be dependent on others.

Presently, the practice in most Muslim countries is to import all machinery along with a little knowledge of assembling its parts from Eastern and Western countries instead of making a serious attempt in fundamental scientific research. The present trend will never lead Muslim countries to scientific and technological self-sufficiency. Imported technology should be accompanied by indigenous research work.

5- There should be cooperation between Muslim countries in the scientific and technological research. For this purpose, establishment of communication links between their universities can serve as a preliminary ground. Moreover, joint research and development bodies (such as the Geneva-based CERN organization) should be formed by the Muslim countries where Muslim scientists and research scholars can work together. There should be no nationalistic bias in this regard. Such centers were widely prevalent during the past ages of Islamic civilization.

All that has been done hitherto in this connection is more or less of a rudimentary nature. Now it is time for a decisive step in this direction.

Notes and Sources

1- Kulayni, **al-Kafi,** Vol. 1, P. 30; Ibn Majah, **Sunan,** Introduction, sec. 17, No. 224.

2- Abu Hamid al-Ghazzali, **Ihya 'Ulum al-Din,** Vol. 1, P. 14.

3- Ibid, Vol. 1, P. 15

4- Ibid, Vol. 1, P. 16.

5- Ibid, Vol. 1, P. 39.

6- Ibid, Vol. 1, P. 22.

7- Mulla Muhsin Fayd Kashani, **Mahajjat al-Bayda,** Vol. 1, P. 59

8- Ibid, Vol. 1, P. 71.

9- Ibid, Vol. 1, P. 72.

10- Sadr al-Din Shirazi, **Sharh Usul al-Kafi,** P. 121.

11- Ibid, P. 120

12- Ibid, P. 121

13- Ibid, P. 129.

14- Fayd Kashani, **al-Wafi,** Vol. 1, P. 36

15- Murtada Mutahhari, Guftar-e-Mah, Vol. 1, P. 137.

16- Abu Hamid Ghazzali, **Ihya 'Ulum al-Din, Vol. 1, P. 39.**

17- Zayn al-Din 'Amili, **Munyah al-Murid** (Qum, 1402 H), P. 25; Ibn Majah **Sunan,** Introduction, sec. 17, No. 223) reports this tradition in the following form:

«من سلك طريقا يلتمس فيه علما سهّل الله له طريقا الى الجنّة».

18- Suyuti, **al-Jami al-Saghir,** Vol. 1, P. 11.

19- Saduq, **Amali** (Beirut, 1400 H), P. 27.

20- Zayn al-Din al-'Amili, **Munyah al-Murid,** P. 71; Suyuti, **al-Jami 'al-Saghir.** Vol. 2, P. 255.

21-'Allamah Muhammad Baqir Majlisi, **Bihar al-Anwar,** Vol. 2, P. 97.

22- 'Amidi, **Ghurar al-Hikam wa Durar al-Kalim** (Tehran University Press), Vol. 2, P. 394.

23- Saduq, **Amali,** P. 394.

24- Suyuti, **al-Jami 'al-Saghir,** Vol. 1, P. 196.

25- **Nahj al-Balaghah** (S. al-Saleh Ed.) P. 393.

26- 'Amidi, **Ghurar al-Hikam wa Durar al-Kalim,** Vol. 2, P. 56.

27- Although even in this case it may be said that the religious information of most of the Muslims is very scanty, and unfortunately most of the laws of Islam have, in practice, lost their social relevance.

28- Kulayni, **al-Kafi,** Vol. 1, P. 27; Harrani, **Tuhaf al-'Uqul** (Qum, 1394 H), P. 264.

29- Fattal Nayshaburi, **Rawdah al-Wa'izin,** Vol. 1, P. 12.

30- M. Baqir Majlisi, **Bihar al-Anwar,** Vol. 1, P. 184; Ghazzali, **Ihya Ulum al-Din,** Vol. 1, P. 9

31- Zayn al-Din 'Amili, **Munyah al-Murid,** P. 24.

32- Ibn abi-Jumhur, **Ghwali al-La'ali,** Vol. 1, P. 101; see also Suyuti's **al-Jami 'al-Saghir,** Vol. 1, P. 558.

33- Zayn al-Din Amili, **Munyah al-Murid,** P. 43; see also Ibn Majah, **Sunan,** Introduction, sec. 23, No. 258.

34- M. Baqir Majlisi, **Bihar al-Anwar,** Vol. 2, 37; see also **al-Jami al-Sayhir,** Vol. 2, P. 487.

35- Kulayni, **al-Kafi,** Vol. 1, P. 41.

36- Sayyid Qutb, **Fi Zilal al-Quran,** Vol. 6, PP. 262-263.

37- A. Noofel **al-Muslimun wa al-'Ilm al-Hadith,** P. 5.

38- M. Shaltut, **Tafsir al-Quran al-Karim** (Dar al-Shuruq) PP. 11-14.

39- **Ideals and Realities,** Selected Essays of Abdus Salam, Scientific Publishing Co., 1984, PP. 299-303, P.C.W. Davies, **The Forces of Nature,** Cambridge University Press PP. 216-227.

PART 2

THE SIGNIFICANCE OF PHYSICAL AND BIOLOGICAL SCIENCES IN ISLAMIC PERSPECTIVE

Introduction

In the Holy Quran the word al-'ilm, knowledge, and its derivatives are used more than 780 times. The first few verses that were revealed to our Prophet (S) mention the importance of reading, pen, and teaching for human beings:

«اقرأ باسم ربك الذي خلق، خلق الانسان من علق، اقرأ و ربك الاكرم، الذي علم بالقلم، علم الانسان مالم يعلم» (العلق/١-٥)

"Read: in the name of your Lord who created. He created man from something which clings. Read and your Lord is the most generous. Who taught with pen. Taught man what he knew not..." (96:1-5)

And about the creation of Adam, the Quran says that even the angels bowed before Adam after he was taught the names:

«وعلم آدم الاسماء كلها ثم عرضهم على الملائكة فقال انبئوني باسماء هؤلاء ان كنتم صادقين، قالوا سبحانك لا علم لنا الاّ ما علّمتنا انك انت العليم الحكيم»

"And He taught Adam the names, all of them; then He presented them unto the angels and said:Now tell Me the names of these if you speak truly. They said 'Glory be to Thee, We know not save what Thou hast taught us. Surely Thou art the All-knowing, the All-Wise!" (2:31-32)

The Quran says that those who know are not comparable to those who do not know:

«... قل هل يستوي الذين يعلمون والذين لايعلمون...» (الزمر:٩)

"Say: Are those who know and those who do not know alike?" (39:9)

And that only the learned understand:

«وتلك الامثال نضربها للناس وما يعقلها الاّ العالمون» (العنكبوت:٤٣)

"And these examples We set forth for the people, but none understands them save those who know." (29:43)

And that only those who have knowledge stand in awe of God:

«... انما يخشى الله من عباده العلماء...» (فاطر:٢٨)

"Of all His servants, only those endowed with knowledge stand in awe of God." (35:28)

In the Islamic tradition, too, there are many words of

praise for knowledge and the learned. A number of traditions are attributed to the Prophet (S) in this regard, some of which are quoted below:

«طلب العلم فريضة على كل مسلم».

"It is an obligation for every Muslim to seek knowledge."

«اطلبوا العلم ولوبالصين»

"Seek knowledge even if it be in China."[2]

«اطلبوا العلم من المهد الى اللحد».

"Seek knowledge from cradle to grave."[3]

العلماء ورثة الانبياء

"Scholars are the heirs of the prophets."[4]

«يوزن يوم القيمة مداد العلماء ودم الشهداء، فيرّجح مداد العلماء على دم الشهداء»

"The ink of the learned will be weighed with the blood of the martyrs on the Resurrection Day; and, then, the ink of the learned would be preferred to the blood of the martyrs."[5]

It has been a subject of fundamental importance from the early days of Islam as to which kind of knowledge Islam recommends; is there any specific kind of knowledge to be sought? Some well-known Muslim scholars have counted as praise-worthy only those branches of knowledge which are directly connected with religion. As for other types of knowledge they hold the view that it is up to the community

to decide which of them are essential for the sustenance and welfare of the community. We believe that there can be no restriction on the acquisition of knowledge, and, if there were any limitations of this kind, our Holy Prophet (S) would have mentioned them. Furthermore, on the basis of the Quran and the Islamic tradition, one can hold that the recommended type of knowledge itself embraces a wide range of subjects.

According to a tradition, Imam Ja'far al-Sadiq, while addressing himself to Mufaddal ibn 'Umar clearly described the vast domain of Islamic Science:

«ذكّرْ يا مُفَضَّل، فيما اعطي الانسانُ علمه وما مُنع، فإنّه أعطي علم جميع ما فيه صلاحُ دينه ودُنياه. فَممّا فيه صلاحُ دينِهِ معرفه الخالق تبارك وتعالىٰ بالدّلائل والشّواهد القائمة في الخلق، ومعرفة الواجب عليه من العدل على الناس كافّة، وبرّ الوالدين، وأداء الامانه. ومُواساة أهل الخِلّة، وأشباه ذلك مما قَد نُوجدُ معرفته والاقرارُ والاعترافُ به في الطّبع والفِطرة، مِن كُلّ أُمّة مُوافِقَةٍ اومُخالِفَةٍ، وكذلك أُعطِيَ علمَ ما فيه صلاحُ دنياه كالزّراعة والغِراس، واستخراج الأرضين، واقتناء الأغنام، والأنعام، واستنباط المياه، ومعرفة العَقاقير التي يُستَشفىٰ بها مِن ضُروب الأسقام، والمعادن التي يُستخرجُ منها أنواعُ الجواهر، وركوب السُّفن والغَوص في البحر، وضُروب الحِيَل في صيد الوحش والطّير والحيتان، والتصرّف في الصّناعات، ووجوه المتاجر والمكاسب، وغير ذلك مِمّا يَطولُ شرحُه ويَكثُر تَعْداده، ممّا فيه صلاحُ أمره في هذه الدّار. فَأُعطِيَ عِلْمَ ما يَصلُح به دينُه ودنياه، ومنعَ ما سوى ذلك مِمّا ليس في شَأنِهِ ولا طاقتِه أن يَعلَمَ، كعلم الغيب وما هُوَ كائنٌ وبعضُ ما قَد كان... فَانظُر كيف أُعطِيَ الانسانُ علم جَميع ما يَحتاجُ إليه لدينِهِ ودُنياه، وحُجِبَ عنه ما سِوىٰ ذلك، ليعرفَ قَدْ ره ونَقصه. وكلاّ الأمرين فيهما صَلاحُه...»

"O, Mofaddal! remember what God has granted man to learn, and what He has forbidden him from knowing. Man may acquire the knowledge of what is good for his life in this world and his faith. In the sphere of religious interests of man are: knowledge of the God, Almighty, through signs and strong proofs that are manifest in the creation; obligatory knowledge of the issues which lead to just treatment of fellowmen; to parents, trustworthiness, helping the poor, and the awareness o

the values and principles that every human being, whether believing in God or unbelieving Him, intrinsically and naturally cherishes'. Man has also been granted capacity of knowing what is good for his worldly interests, such knowledge includes the following: agriculture, plantation, cultivation of land, animal husbandry, utilization of pharmaceutically useful plants, exploitation of mineral resources, navigation and diving the seas, methods and weapons of hunting (animals and birds) and fishing, management of various industries, a variety of trades and professions, and many other disciplines profitable to man in this world. Therefore, God has made man capable of attaining all knowledge that he needs for the benefit of his worldly life and faith and He has forbidden what is unfit and beyond his reach such as: occultation, prevision, knowledge of certain past events..... So, look and reflect on how God granted man some capabilities to get what he needs for this world and his religion, while He has deprived him of other abilities so that he may appreciate what he has, and be aware of what he lacks-both of which are to his benefit."[6]

The only limit set to the acquisition of knowledge in Islam is that Muslims should seek useful knowledge. Our great Prophet (S) is reported as having said:

«اللّهم انّی اعوذبك من علم لاینفع»

"My Lord, save me from the useless knowledge."[7]

Any knowledge helping man in performing his God-assigned role in this world is useful, other than that is considered useless knowledge. The following statement which has been reported from Imam Sadiq, may be used as a criterion to distinguish between useful and useless sorts of knowledge:

«فكلّ ما يتعلّم العباد اويعلّمون غيرهم من صنوف الصناعات مثل الكتابة والحساب والتجارة

والصياغة والسراجة والبناء والحياكة والقصارة والخياطة وصنعة صنوف التصاوير ــ ما لم يكن مثل الروحاني ــ وانواع صنوف الالات التي يحتاج اليها العباد التي منها منافعهم وبها قوامهم وفيها بلغة جميع حوائجهم فحلال فعله وتعليمه والعمل به وفيه لنفسه او لغيره وان كانت تلك الصناعة وتلك الالة قد يستعان بها على وجوه الفساد ووجوه المعاصي ويكون معونة على الحق والباطل. فلا بأس بصناعته وتعليمه، نظير الكتابة التي هي على وجه من وجوه الفساد من تقوية معونة ولاة ولاة الجور. وكذلك السكين والسيف والرمح والقوس وغير ذلك من وجوه الآلة التي قد تصرلاف الى جهات الصلاح وجهات الفساد وتكون الة ومعونة عليها، فلا بأس بتعليمه وتعلمه واخذ الاجر عليه وفيه والعمل به وفيه لمن كان له فيه جهات الصلاح من جميع الخلائق ومحرم عليهم فيه تصريفه الى جهات الفساد والمضار، فليس على العالم والمتعلم اثم ولا وزر لمافيه من الرجحان في منافع جهات صلاحهم وقوامهم وبقائهم به وانما الاثم والوزر على المتصرف بها في وجوه الفساد والحرام. وذلك انما حرم الله الفساد التي حرام هي كلها التي يجيء منها الفساد محضا نظير البرابط والمزامير والشطرنج وكل ملهوية والصلبان والاقسام وما اشبه ذلك من صناعات الاشربة الحرام وما يكون منه وفيه الفساد محضا ولا يكون فيه ولا منه شيء من وجوه الصلاح فحرام تعليمه وتعلمه والعمل به واخذ الاجر عليه وجميع التقلب فيه من جميع وجوه الحركات كلّها. الا ان تكون صناعة قد تتصرف الى جهات الصنائع، وان كان قد يتصرف بها ويتناول بها وجه من وجوه المعاصي. فلعلّه لما فيه من الصلاح حلّ تعلّمه والعمل به، وحرم على من صرفه الى غير وجه الحق والصلاح».

"Any sort of science and technology which eliminates man's needs or is useful to God's servants and helps them to continue their lives and meet their daily needs, is permitted by religion to teach or to learn. For example they are: writing, accounting, commerce, work of a goldsmith, saddle-making, brick-laying, knitting, tailoring, painting and drawing (with the exception of animate beings) and making tools required by people. But if such knowledge or skill could be used for vicious and sinful purposes as well as rightful and noble deeds, such as writing which may be abused for strengthening oppressive rulers, is not forbidden; so is making knives, swords, spears, bows and arrows which can be used in both good and bad ways. Teaching and learning such trades or receiving fees for their instruction, provided that it is for the benefit of God's servants, is

permissible; but their use in harmful or vicious ways is forbidden; in either case it is not a sin for man to teach or learn such a trade, for utility of these tools is greater than the harm caused by their abuse, and the continuity of social life depends on them. Their misuse, however, is a sinful deed. This is because God has forbidden to go after anything which is totally corrupt and has no useful result. Thus, it is forbidden to make strings (of musical instruments) flutes, chess, various instruments of entertainment and pleasure, crosses, idols or the like, and intoxicating drinks, and anything causing disturbance or harm, or ending in corruption and having no use for man, is forbidden to teach, to learn or impart it to others and to obtain fees or wages for them. If there is a craft or industry that is used for other industries or crafts, even if it is sometimes used for sinful purposes, it would be permissible to be developed, but using it in the wrong way would be unlawful."[8]

Islam and Science

In this section, firstly we intend to deal with the reasons that justify study of the sciences (of nature) from the Islamic view-point and then we shall try to see how far the Islamic conception of knowledge is compatible with sciences of nature. The study of the Quran and the Islamic tradition indicates that for two fundamental reasons Islam recognizes the significance of science:

1- The role of science in knowing God.

2- The role of science in the stability and advancement of the Islamic society.

1- The role of science in knowing God:

In the Holy Quran there are more than 750 verses which refer to natural phenomena, and people are asked to think over them in order to recognize Allah through His signs.

These verses can be divided into the following categories:

i) The verses that either describe the constituent elements of objects or enjoin man to discover them. For example we read in the Quran:

«فلينظرِ الإنسانُ مِمَّ خُلِقَ».

(الطارق/٥)

"So let man consider of what he is created." (86:5)

«واللهُ خلقَ كلَّ دابَّةٍ من ماءٍ».

(النور/٤٥)

"And Allah has created every living creature from water." 24:45)

«انّا خلقنا الانسان من نطفة امشاج نبتليه فجعلناه سميعا بصيراً» (الانسان:٢)

"We created man of a sperm-drop, a mingling, trying him; and we made him hearing, seeing."

ii) The verses that either give an account of the manner of creation of material objects or enjoin man to discover their genesis. The following are typical of this category:

«وهو الذي خلق السمٰوات والارض في ستة ايام وكان عرشه على الماء...» (هود:٧)

"And it is He who created the heavens and the earth in six periods, and His Dominion was upon the waters..." (11:7)

«ولقد خلقنا الانسان من سلالة من طين. ثم جعلناه نطفة في قرار مكين. ثم خلقنا النطفة علقة فخلقنا العلقة مضغة فخلقنا المضغة عظاما فكسونا العظام لحما ثم أنشأناه خلقاً آخر فتبارك الله احسن الخالقين». (المؤمنون:١٢ــ١٤)

"And certainly we created man of an extract of clay, then We

made him a small life-germ in a firm resting place. Then We made the life-germ a clot, then We made the clot a tissue, then We made the tissue bones, then We clothed the bones with flesh, then We caused it to grow into another creation, so blessed be Allah, the best of the Creators." (23:12-14)

«اولم ير الذين كفروا ان السموات والارض كانتا رتقا ففتقناهما...» (الانبياء: ٣٠)

"Do not those who disbelieve see that the heavens and the earth were closed up which we then parted asunder..." (21:30)

«خلق السموات بغير عمد ترونها والقى في الارض رواسي ان تميد بكم...» (لقمان: ١٠)

"He created the heavens without pillars you can see, and He cast on the earth firm mountains, lest it shakes with you..." (31:10)

«ثم استوى الى السماء وهي دخان» (حم: ١١)

"Then He directed himself to the heaven when it was a vapour..." (41:11)

«افلاينظرون الى الابل كيف خلقت والى السماء كيف رفعت والى الجبال كيف نصبت والى الارض كيف سطحت.» (الغاشية: ٢٠ــ١٧)

"Will they not then consider how the camel was created, how heaven was lifted up, how the mountains were hoisted, how the earth was outstretched." (88: 17-20)

iii) The verses in which man is enjoined to discover how our physical universe came into existence. The following are typical of this kind of verses:

«قل سيروا في الارض فانظروا كيف بدأ الخلق» (العنكبوت: ٢٠)

"Say: journey in the earth, then behold how He originated creation." (29:20)

«أولم يروا كيف يبدئ الله الخلق ثم يعيده» (العنكبوت:١٩)

"Have they not seen how God originates creation, then brings it back again." (29:19)

iv) The verses in which man is enjoined to study natural phenomena. The following verses typify this category:

«الم تر ان الله انزل من السماء ماء فسلكه ينابيع في الارض ثم يخرج به زرعا مختلفا الوانه، ثم يهيج فتريه مصفرا ثم يجعله حطاماً ان في ذلك لذكرى لاولي الالباب» (الزمر: ٢١)

"Do you not see that Allah sends down water from the heaven (cloud), then makes it go along in the earth in springs, then brings forth there with herbage of various colours, then it withers so that you see it becoming yellow, then He makes it a thing crushed and broken into pieces? Most surely there is a reminder for the men of understanding." (39:21)

«الله الذي يرسل الرياح فتثير سحابا فيبسطه في السماء كيف يشاء ويجعله كسفا فترى الودق يخرج من خلاله...» (الروم:٤٨)

"Allah is He who sends forth the winds that stir up clouds, and He spreads them in heaven as He pleases, and shatters them; then you see the rain issuing out of the midst of them..." (30:48)

«ان في خلق السموات والارض واختلاف الليل والنهار والفلك التي تجري في البحر بما ينفع الناس وما انزل الله من السماء من ماء فاحيا به الارض بعد موتها وبث فيها من كل دابة وتصريف الرياح والسحاب المسخر بين السماء والارض لآيات لقوم يعقلون» (البقرة: ١٦٤)

"Surely in the creation of heavens and the earth and the alternation of night and day and the ship that runs in the sea with profit to men, and the water God descends down from heaven therewith reviving the earth after it is dead and his scattering abroad in it all manner of crawling things and the turning about of the winds and the clouds compelled between heaven and earth, there are signs for a people having understanding." (2:164)

v) The verses in which God swears by various natural objects. Here we cite some examples:

«والشمس وضحيها والقمر اذا تليها، والنهار اذا جليها، والليل اذا يغشيها، والسماء وما بنيها والارض وما طحيها...» (الشمس:٦—١)

"By the sun and his morning brightness, and by the moon when she follows him, and by the day when it displays him and by the night when it enshrouds him and by the heaven and that which built it and by the earth and that which extended it." (91:1-6)

«فلا اقسم بمواقع النجوم وأنه لقسم لو تعلمون عظيم» (الواقعه:٧٥—٧٦)

"But nay! I swear by the fallings of stars. And most surely it is a very great oath if you only know." (56:75-76)

«والسماء والطارق. وما ادريك ما الطارق. النجم الثاقب» (الطارق:٣—١)

"By heaven and the night star. And what shall teach you what is the night star, the piercing star." (86:1-3)

vi) The verses in which with reference to some natural phenomena the possibility of the occurence of Resurrection has been explained. Examples:

يا ايها الناس ان كنتم في ريب من البعث فانّا خلقناكم من تراب ثم من نطفة ثم من علقه ثم من مضغة مخلقة وغير مخلقة .... وترى الارض هامدة، فاذا انزلنا عليها الماء اهتزت وربت وانبتت من كل زوج بهيج». (الحج:٥)

"O people! If you are in doubt about the raising, then surely we created you from dust, then from a small life-germ, then from a clot, then from a lump of flesh, complete in make and incomplete... and you see the earth's sterile land but when We send down on it the water, it stirs and swells and brings forth of every kind a beautiful herbage." (22:5)

اوليس الذى خلق السموات والارض بقادر على ان يخلق مثلهم بلى وهو الخلاّق العليم» (يس:٨١)

"Is not He who created the heavens and the earth able to create the like of them? Yes! And He is the Creator (of all), the Knower." (36:81)

«يخرج الحيّ من الميّت ويخرج الميّت من الحـي ويحيي الارض بعد موتها وكذلك تخرجون» (الروم:١٩)

"He brings forth the living from the dead and brings forth dead from the living, and gives life to the earth after its death, and thus shall you be brought forth." (30:19)

vii) The verses that emphasize the thoroughness and orderliness of the creations of Allah. The following verses envisage this point:

«وترى الجبال تحسبها جامدة وهي تمر مر السحاب، صنع الله الذي اتقن كل شيْ...» (النمل:٨٨)

"And you shall see the mountains, that you supposed fixed,

passing by like clouds-God's handiwork, who has created everything very well..." (27:88)

«الذي خلق سبع سمٰوات طباقا، ما ترى في خلق الرحمن من تفاوت، فارجع البصر هل ترى من فطور. ثم ارجع البصر كرتين، ينقلب اليك البصر خاسئا وهو حسير» (الملك: ٤ــ٣)

"Who created seven heavens one upon another. You see no imperfection in the creation of the Beneficient God; then look again, can you see any disorder? Then return back the eye again and again, your look shall come back to you dazzled, aweary." (67:3-4)

«والارض مددناها والقينا فيها رواسي وانبتنا فيها من كل شيء موزون» (الحجر: ١٩)

"And the earth, we stretched it forth, and cast on it firm mountains, and We caused to grow in it of everything justly weighed." (15:19)

«وخلق كل شيء فقدره تقديرا» (الفرقان: ٢)

"And He created everything, then, he ordained it very exactly. (25:2)

«خلق السمٰوات والارض بالحق. يكور الليل على النهار ويكور النهار على الليل وسخر الشمس والقمر كل يجري لاجل مسمى...» (الزمر: ٥)

"He created the heavens and the earth in truth, wrapping night about the day, and wrapping day about the night, and He has subjected the sun and the moon, each of them running to an assigned term." (39:5)

«وما خلقنا السماء والارض وما بينهما لاعبين» (الانبياء: ١٦)

"And we did not create the heaven and the earth and what is between them for sport." (21:16)

viii) The verses that explain the harmony in which man exists with the rest of the physical universe and the subservience of what is in the earth and in the heavens to man. The following exemplify this type of verses:

«هوالذي خلق لكم ما في الارض جميعاً» (البقرة:٢٩)

"It is He Who created for you all that is in the earth." (2:29)

«وسخر لكم ما في السموات وما في الارض جميعا منه..» (الجاثية: ١٣)

"And He has made subservient to you what is in the heavens and what is in the earth, all together from him..." (45:13)

«هوالذي جعل لكم الارض ذلولا فامشوا في مناكبها وكلوا من رزقه..» (الملك:١٥)

"It is He Who made the earth submissive to you; therefore walk in its tracts, and eat of His provisions..." (67:15)

«والانعام خلقها لكم فيها دفء ومنافع ومنها تاكلون» (النحل:٥)

"And He created the cattle for you; you have in them warm clothing and many advantages, and of them you eat." (27:5)

«وانزلنا الحديد فيه بأس شديد ومنافع للناس» (الحديد: ٢٥)

"And We sent down iron, wherein is great might, and many uses for men..." (57:25)

«وهوالذى جعل لكم النجوم لتهتدوابها فى ظلمات البرّ والبحر، قد فصّلنا الآيات لقوم يعلمون» (الانعام/٩٧)

"And He is who has made the stars for you that you might follow the right way thereby by the darkness of the land and sea; truly we have made plain the communications for a people who know." (6:97)

In these verses the Almighty invites His servants to see and reflect upon the natural phenomena, and through the observation of order and coordination in the system of creation and its wonders get closer to Him. It is obvious that for having a clear conception of the issues referred to in these verses, and for the discovery of the answers to the problems therein one has to be familiar with the natural and physical sciences because a superficial knowledge of natural phenomena cannot reveal the grandeur of Creation to man. It is for this very reason that in the verses 27-28 of the chapter **Fatir,** after describing a number of natural phenomena, God says:

«... انّما يخشى الله من عباده العلماء...» (فاطر/٢٧ــ٢٨)

"...of His servants only those who are possessed of knowledge fear Allah..." (35:27-28)

also «بل هو آيات بينات في صدور الذين اوتوا العلم...» (العنكبوت:٤٩)

"Nay, these are clear signs in the breasts of those who have been given knowledge..." (29:49)

On the other hand, the knowledge of natural phenomena is effective in leading us closer to God only if we have faith. The following verse asserts this point beautifully:

«قل انظروا ماذا في السموات والارض وما تغني الآيات والنذر عن قوم لايؤمنون» (يونس:١٠١)

"Say: Behold what is in the heavens and in the earth; but neither

signs nor warnings avail a people who do not believe." (10:101)

One should not forget, however, that the Quran is not a handbook of experimental science and if it explains some natural phenomena, it is because of the following reasons:

i) The study of natural phenomena and wonders of creation strenghtens man's faith in God.

ii) By becoming familiar with the opportunities that God has provided for man, he becomes more knowledgeable about Allah and by obtaining just benefits from them, he can offer his gratitude to God.

In fact, it was due to the encouragement of the Quran for the study of natural phenomena that Muslim scientists became deeply involved in this field. The development of Islamic civilization, too, was to a great extent indebted to the Quranic outlook. The prominent Muslim scientists of the past have acknowledged their indebtedness to the Quran, and even some Western scholars have acknowledged it.

For example Levy, in **the Social Structure of Islam,** says: "Apart from a small number of investigators inspired by Greek philosophic ideals, the Muslims who engaged in the pursuit of science did so... in order to discover, in the wonders of nature, the signs or tokens of the glory of God."[9]

George Sarton,inhis book **"Introduction to the History of Science"** writes that in order to fully conceive the motive behind the activities of Muslim scholars in the fields of science, one should note the axial role of the Quran for them.[10]

In his book, the **Kitab al-Tahdid Nihayat al-Amakin,** al-Biruni writes: "When a person decides to discriminate between truth and falsehood, he has to study the universe and find out whether it is eternal or created. If somebody thinks that he does not need this kind of knowledge, he is however in need of thinking about the laws that govern our world, in part or in its entirety. This leads him to know the truth about them, and paves the way for knowing the being, who directs and controls the universe, and His attributes. This is, in fact, the kind of truth that God enjoined His knowledgeable

servants to search for, and Allah spoke the truth when He said:

«... ويتفكرون في خلق السموات والارض، ربّناماخلقت هذا باطلا...» (آل عمران: ۱۹۱)

"...And reflect upon the creation of the heavens and the earth: our Lord Thou has not created this in vain." (3:191)

This verse contains what I explained in detail, and if man works according to it, he can have access to all branches of knowledge and cognition."[11]

Also in al-Biruni's **Kitab al-Jamahir** we read: "Sight connects what we see to the signs of Divine wisdom in creatures, and from the creation we deduce the existence of the Creator." [12]

In that part of his diary which belongs to the year 417 Hijrat, Ibn al-Haytham writes: "From my very childhood I have been wondering about various peoples (i.e. sects) and their beliefs. Each sect has its own opinions and beliefs according to the principles of its faith. I, therefore, began to doubt the views of various sects, and I am now convinced that truth is one and the same and their differences are based on the ways and methods of finding the truth. Anyhow, having gained an insight into the intellectual basis, I decided to search for the truth and tear away the veil of superstitions and doubts, which an illusive vision has cast on the people, and so that the doubting and sceptical people may lift their gaze freed from the labyrinth of scepticism. Afterwards, I decided to discover as to what is that brings us closer to God, what pleases Him most, and what makes us submissive to his ineluctable Will. My feeling were akin to those of Gallen, which he describes in the seventh chapter of his **Hilat-ul-Bur.** While addressing his pupils, he avers:

"I am not aware of the feelings, thoughts, and sensations which have guided me since my childhood. Call it what you may-a matter of chance, or intuition vouchsafed by Almighty God, or madness. You may attribute the source of my

inspiration to any of the three. I shunned the publications, looked at them with contempt and derision and did not incline toward their company. I constantly sought knowledge and truth, and it became my belief that for gaining access to the effulgence and closeness of God, there is no better way than that of search for truth and knowledge." (End of quotation from Gallen). "At last I was led to the conclusion that Truth can only be discovered by the formulations of theories, the content of which is sense and their form is intellectual equipment. I found such theories present in the logic, physics, and theology of Aristotle... when I discovered what Aristotle had done, I decided to understand philosophy whole-heartedly. There are three disciplines which make philosophy: mathematics, physical sciences, and theology. Therefore, I learnt their principles and in that way I acquired skill in their derivatives... Realising the mortality of man,... I explained and summarised whatever knowledge I had acquired in these three disciplines, and wrote some books in the explanation of the difficulties in relation to their derivatives. This has been going on till now i.e. 417 A.H."[13]

We see that the Muslim scientists' quest for knowledge of natural phenomena was due to the fact that they considered this course of study to be one of the best ways of approaching God. They believed that by studying signs of God in nature one can discover the interrelation between all parts of the Universe and the Unity hidden behind this world of multiplicity, and this in turn leads him to the unique Creator. In the glorious period of Islamic civilization, Muslim scientists assimilated cosmological sciences of their time into their own knowledge, because these sciences too, in their view, were trying to demonstrate the unity of nature and were searching for the primary Cause of things, and, thus, were conformable to Islamic perspective. In this process, however, they first drew out the foreign elements, and then infused the rest with the Islamic concepts. Furthermore, Muslim scientists employed both experimental and theoretical methods of investigation.

Unfortunately, this kind of outlook toward the sciences of nature was gradually discarded in the Islamic world and Muslims neglected the recommendations of the Holy Quran about the study of nature and taking advantage of the opportunities that God has provided for man. On the other hand, non-Muslims studied these subjects, and this gave them mastery over the rest of the world. An important consequence of this grave mistake was that a large gap appeared between religion and the mundane affairs of Muslims and they were forced to try to learn science and technology from the West. A by-product of this was the infiltration of undersirable features of Western civilization into the Islamic world. As a consequence of these unfortunate facts, Muslims have reached a point where they have lost their spiritual qualities, and are not capable of controlling their mundane affairs without foreign assistance.

11- The Role of Science in the Stability and Advancement of an Islamic Society

According to the Holy Quran, Islam is a Universal religion:

«قل يا ايها الناس إنّي رسول الله اليكم جميعاً» (الاعراف:١٥٨)

"Say: O mankind surely I am the Messenger of God to you all." (7:158)

«وما ارسلناك الا كافة للناس بشيراً ونذيرا» (سبأ:٢٨)

"And we have not sent you but to all mankind as a bearer of good news and as a warner." (34:28)

And the aim of Islam is to establish a monotheistic society in which God's word is the highest:

«وجعل كلمة الذين كفروا السفلى وكلمة الله هي العليا» (التوبة:٤٠)

"And He made the word of the unbelievers the lowest, and God's word is the uppermost." (9:40)

In order to establish such a society and to keep it immune from the dangers of the unbelievers, the Islamic world has to be completely independent. The following verse envisages this point:

«ولن يجعل الله للكافرين على المؤمنين سبيلاً» (النساء:١٤١)

"And God will not grant the unbelievers any way over the believers." (4:141)

Moreover, the Holy Prophet is reported to have said:

الاسلام يعلو ولا يعلى عليه

"Islam is superior to(all)others and nothing can surpass it."[14]

Obviously, in order to guarantee the superiority of Islamic policy over others, Muslims should try to make themselves independent and self-sufficient. It is for this reason that Muslim jurisprudents have given the verdict that any deed leading to the supremacy of unbelievers over the Muslims is forbidden.[15] Moreover, they have decreed that it is a duty of an Islamic society to provide whatever is needed for the sustenance of the society. In the Holy Quran itself Muslims are enjoined to prepare and equip themselves in every respect to face the challenge of the forces of unbelievers:

«واعدوا لهم ما استطعتم من قوة ومن رباط الخيل ترهبون به عدو الله وعدوكم...» (الانفال:٦٠)

"And prepare against them whatever force and strings of horses you can to terrify thereby the enemy of God and your enemy." (8:60)

Today, everything revolves around the axis of science and technology. Therefore, in order to be independent and self-reliant, Islamic policy should provide all scientific and technological capabilities that are essential for its self-sufficiency and glory. This involves training of specialists of high calibre in every important field of science and technology, and equipping them with the best technical facilities. Unfortunately, since Muslims have overlooked the need to equip themselves with scientific and technological knowledge and have given the way to the others in these fields, they have become more and more dependent for their very necessities of life on non-Muslims. Ibn Ikhwah, a Shafi'i jurisprudent of the seventh century after Hijrah, tells us in the **Kitab Ma'alim al-Qurbah fi Ahkam al-Hesbah:**

"Learning of medicine is compulsory for the community as a whole, but in our time Muslims do not concern themselves with it, and we have many cities that have only Christian and Jewish physicians, whose testimony about medical matters is not acceptable in problems related to religion. In our time, I do not see many studying medicine, but I do see many who are involved deeply into jurisprudence and ethical and polemical issues and our city is full of jurisprudents who are busy with giving their opinion about various happenings. I do not know how it is permitted, religiously speaking, that at the time when some compulsory duty of the community is neglected one gets involved in something that others have chosen to get preoccupied with it..."[16]

If Ibn Ikhwah was complaining in the seventh century after Hijra, that most of the physicians in the Muslim society of his time were Jews or Christians, and Muslims were neglecting this compulsory duty, today, we see that Muslims are unable to use their resources and they let others exploit them. As the famous Pakistani poet Iqbal states:

دیروز مسلم از شرف علم سربلند امروز پشت مسلم و اسلامیان خم است

"The Muslim of yesterday was proud and esteemed for

his knowledge, (but) today the believers' and Muslims' back is bent (before others). Here one asks, "While the Quran says unbelievers will in no way have domination over the believers, why are they now ruled by unbelievers?"

The answer may be found in the fact that the Muslims today are not real believers, and they overlook their Islamic obligations. They neither have the unity nor do they go after knowledge and other provisions recommended by the Holy Quran:

«واعدوا لهم استطعتم من قوة ومن رباط الخيل ترهبون به عدو الله و عدوكم...» (الانفال: ٦٠)

"And prepare against them what force you can and horses tied at the frontier, to frighten thereby the enemy of Allah and your enemy..." (8-60)

Despite all the categorical orders of the Quran, let us see, what we have done in the way of preparing ourselves and exulting Islamic Society. While Islam does not allow the dominance of the unbelievers over believers even in a simple matter, like inheritance[17], why are Muslims so entirely dependent on the products of East or West?

It will not be unrealistic to have a look at the present state of the Islamic world:[18]

There are about 50 Islamic countries with 1/5 of the total population of the world, and covering 1/5 of the continents of the earth. They possess fifty percent of the oil reserves as well as other natural resources of the world. On the other hand, the Islamic nations depend on Eastern or Western countries for their food, technology, science and defence requirements. They consume more food than they can produce. In recent years, food consumption in Islamic countries has risen by $2^1/_2$ percent while the rise in the population of these countries has an average growth of 3 percent.

The rate of literacy in the industrially advanced countries is 95%, in the Third World countries 55% and in the

Islamic countries 34% only (this rate in the case of the United States, Russia and Japan is 99%; in China 56% and in Pakistan 21%). Among the population aged 5-19, the percentage of students is as follows:

Industrially advanced countries 75%
Third world countries 48%
Islamic countries 40%

Among the population aged 20-24, university or college students, the percentage is as follows:

Industrially advanced countries 33%
Third World countries 9%
Islamic countries 4%

According to the report submitted to the Islamic Conference in Islamabad in May 1983, the number of research scholars in Islamic countries was about 45000, whereas $1^1/_2$ million researchers were in Russia, and four hundred thousands in Japan in the same year. In the year 1974, thirty-five thousands research scholars were in Israel, and in Iran only 4900 scholars were doing research work in the same year.

The annual number of university and college graduates in the United States is 50000, and in Japan, with $^1/_2$ of the population of U.S.A., this number is doubled. On the other hand, the group of Islamic countries which have populations of over one million (numbering 28 altogether) do not produce more than 5000 graduates a year.

In the year 1976, 352000 scientific research papers were written in the world, of which 94.5% (333000) came from the industrially advanced countries which have only $^1/_4$ of the world population; and the third world countries, with the population of 3/4 of the world population, produced only 19000 articles, and out of this only 17% (i.e. 3300) were written in the Islamic countries. Comparatively speaking, the Islamic world contributed only 9% of the whole work and 2/3 of the 9% belonged to Egypt, Nigeria, Iran, Turkey, Malaysia and Pakistan.

The number of inventions annually registered in the United States or Russia is 50,000, whereas in the whole

Islamic countries this figure falls below 500. As for physicians, there is one doctor for every 600 persons in the U.S.A., 300 persons in Russia, 3000 persons in Pakistan, and 4000 persons in Iran.

It is obvious that in this deplorable condition the Islamic countries will continue their dependence on the West until they fully equip themselves in the way of providing their own food and technology, and even this has to be done in the form of a mobilized combat, without which there seems to be little likelihood of the elimination of Western cultural and economic influence over Islamic countries. Imam Khomeini in his book "**Tahir-al-wasilah**" says: "Should the danger of political and economic domination of the enemy increase to the extent that it might bring the Islamic society under its political and economic yoke (causing humiliation and shame to Islam and Muslims and weakening them), it would be incumbent on all Muslims to defend their cause with the means and tools similar to those of the enemy."[19]

Here, we find it necessary to mention two important points: a) from the Islamic viewpoint it is faith which guarantees the proper use of knowledge. In the Quran, knowledge and faith stand side by side. In the first verse revealed to the Prophet (S) reading has been recommended; but reading stands next to the name of the Creator, which means acquiring knowledge should be in God's name, not in that of Satan. Knowledge together with faith leads to righteousness; whereas knowledge in the hand of unbelievers is a means of destruction. Many abuses of knowledge have been made by the unbelieving scientists. A tradition related to our Prophet (S) says:

الا ان شر الشر شرار العلماء وان خير الخير خيار العلماء

"Surely, the worst of all evils are wicked scholars and the best of all good things are good scholars."[20]
As Mowlawi puts it:

بد گهر را علم و فن آموختن — دادن تیغ است دست راهزن
تیغ دادن در کف زنگی مست — به که باشد علم ناکس را بدست
علم و مال و منصب و جاه وقران — فتنه آرد در کف بد گوهران
پس غزا زین فرض شد بر مومنان — تا ستانند از کف مجنون سنان

"To impart knowledge and arts to villains, is like giving a sword in the hands of a robber; putting a sword in the hand of a drunk, is a lesser evil than arming a villain with knowledge, wealth, knowledge and position are the cause of corruption in the hands of ignobles; Therefore, it is incumbent on the believers, to snatch spears from the grip of lunatics."

The Holy Quran itself considers religious faith to be an essential factor for attaining all-round superiority.

«ولا تهنوا ولا تحزنوا وانتم الاعلون ان کنتم مؤمنین» (آل عمران:۱۳۹)

"Faint not, neither sorrow; you shall be the upper ones if you are believers."(3:139)

«ولو ان اهل القری آمنوا واتقوا لفتحنا علیهم برکات من السماء والارض..» (الاعراف:۹۶)

'Yet had the peoples of the cities believed and been God fearing, e would have showered upon them blessing from heaven and rth..." (7:96)

«... ولله العزة ولرسوله وللمؤمنین...» (المنافقون:۸)

'Yet glory belongs unto God, and unto His Messenger and the elievers...' (63:8)

It is to be noted that despite the importance given to learning science and technology, they are not considered to be sufficient in themselves; and Muslims should, in addition to raising their standard in the material and scientific fields have firm belief in the Islamic ideology and follow the religious principles for attaining the desired goals. Sayyid Qutb elaborates this matter in a convincing manner:

«ولن يجعل الله للكافرين على المؤمنين سبيلاً» (النساء:١٤١).

"God has made a clear promise and has given a definite order that if real faith penetrates into the souls of the faithful and is exemplified in their lifestyle and their system of government, and if in all their acts and discourses Muslims pay attention only to Allah.... then Allah will not grant unbelievers any superiority over the believers. In order to guarantee our victory in every place and at all times, we should give prioity to our faith and its requirements... and it is faith itself that demands from us strngth and self-sufficiency. It forbids us from enemies and not seeking help from anybody but Allah."[21]

b) Islam encourages Muslims to equip themselves with science and technology, to guarantee the independence and development of the Islamic society, for the sake of the preservation of spiritual aspects. Even in the Quranic verse:

«واعدوا لهم ما استطعتم من قوة ومن رباط الخيل...» (الانفال:٦٠)

"And prepare against them what force you can and horses tied at the frontier to frighten thereby the enemy of Allah and your enemies." (8:60).

That God invites Muslims to strengthen their defence; it is immediately added that its aim is weakening (frightening) of the enemies of God and Muslims. Therefore, while

strenghthening their material powers, Muslims should employ them in the service of spiritual cause and for the realization of Islamic ideals. They should not seek material progress for its own sake. The following glorious verses propound this idea in clear terms:

«انّا جعلنا ما على الارض زينة لها لنبلوهم ايهم احسن عملا» (الكهف:٧)

"Surely We have made whatever is on the earth an embelishment for it, so that We may try them (as to) which of them is best in works." (18:7)

«وهو الذى خلق السموات والارض فى ستة ايام وكان عرشه على الماء ليبلوكم أيكم احسن عملاً...» (هود/٧)

"And He is Who created the heavens and the earth in six periods and His dominion (extends) on the waters-that He might manifest you, which of you is best in action." (11:7)

Conclusion

We can notice that in Islam, everything revolves around the axis of the unity of God, and that the desirability of science and technology is based on the fact that these are tools that add to our knowledge of God and are effective in the establishment of an independent monotheistic society. In our age, when the Islamic countries are under the influence of the unbelievers, Muslims have a great responsibility on their shoulders. Take into consideration a verse we quoted earlier and re-quote here:

«واعدوا لهم ما استطعتم من قوة ومن رباط الخيل ترهبون به عدوالله...» (الانفال:٦٠)

According to this Quranic injunction, Muslims should prepare and equip themselves in every respect, and since, today empirical sciences play a fundamental role in every aspect of the material life, strengthening of this dimension of Islamic policy is a necessity. The Islamic countries, therefore, should establish centers for promoting scientific and technological research and should train experts of high calibre in all useful fields of science and technology. In this attempt, however, they should put the emphasis on fundamental sciences, so that they are able to advance original research rather than imitating others.

On the other hand, in order to ensure the success o scientific renaissance in Islamic policy, several important points should be taken into consideration:

1) It is obvious that at the present time, Muslims need to learn science and technology from the countries that ar advanced in these fields, and, of course, this is not by itself blameworthy action. In fact the Holy Prophet is reported t have said:

اطلبوا العلم ولو بالصين»[1]

"seek knowledge even if it be in China."

ضالة المؤمن فحيث وجدها فهو احق بها»[2]

"The believer is always searching for wisdom, where he may find it, it is his, because he deserves to have it m than anyone else."

«خذوا العلم من افواه الرجال»[23]

"Acquire knowledge from what people say."[26]

And Imam 'Ali (peace be upon him) is reported to have said:

«حق على العاقل ان يضيف الى رأيه رأي العقلاء و يضم الىٰ علمه علوم الحكماء»

"It is praiseworthy for every wise man to add the opinions of other sages to that of his own, and add the learneds' knowledge to his own knowledge."[24]

«العلم ضالة المؤمن، فخذوه ولومن ايدى المشركين»

"Knowledge is the lost property of a believer; thus, acquire it even if it is in the polytheists' hands."[25]

The Muslim scholars of the past did the same and what we are supposed to do is to receive knowledge from non-believers in a selective manner i.e. to purge it from the elements alien to Islam and to remodel it in the light of the Islamic world view. It is under the guidance of these principles that Muslims can acquire knowledge from non-Muslim sources and mould it to suit the Islamic ideals. It is only under these conditions that different levels of knowledge can be co-ordinated to attain our aim and can take us closer to God.

II) We should revive the scientific spirit of our learned ancestors and their zeal to reshape different branches of knowledge for making use of them for the development of Islamic civilization. They did not see any real contradiction between the so-called religious sciences and the physical sciences, and they considered the aim of both to be the same. In their view both the biological and physical sciences show the harmony between various parts of the Univers, and therefore, they lead us to God-something which is the aim of

religion too. It was due to this kind of outlook that religious as well as physical sciences were taught together and some of the Muslim scholars were first-rate authorities in both of them. This praiseworthy tradition has to be revived again, and the curricula of our universities have to include both religious sciences and the latest scientific and technological advances.

It is only in this way that Muslims can be equipped with the latest developments made in scientific fields and at the same time protect their students against atheistic and materialistic teachings of the East and the West, and can bring science and technology under the guidance of Islamic outlook.

III) According to the Holy Quran man is the vicegerent of God on earth:

(«واذ قال ربك للملائكة اني جاعل في الأرض خليفة...») (البقرة: ٣٠)

"And when your Lord said to the angels 'I am going to place in the earth a vicegerent'..." (2:30)

(«هوالذي جعلكم خلائف الارض فمن كفر فعليه كفره...») (فاطر: ٣٩)

"It is He Who appointed you vicegerents in the earth; so whoever disbelieves, his unbelief shall be charged against himself." (35:39)

ثم جعلناكم خلائف في الارض من بعدهم لننظر كيف تعملون» (يونس: ١٤)

"Then We appointed you vicegerents in the earth after them, so that We may see how you act." (10:14)

Now, in order to be able to play this role, God has given man all kinds of gifts and has endowed him with intelligence, and has provided a nice harmony between the creation of

man and the rest of the Universe so that human beings can take care of their needs. Again to quote the Holy Quran:

«هوالذي خلق لكم ما في الارض جميعاً» (البقرة:٢٩)

"He it is Who created for you all that is in the earth." (2:29)

«ولقد مكناكم في الارض وجعلنا لكم فيها معايش..» (الاعراف:١٠)

"And certainly We have established you in the earth and made in it means of livelihood for you..." (7:10)

It is therefore for Muslims to employ their knowledge and technology for the solemn goals of Islam and higher interests of humanity in order to exemplify the glorious verse:

(«كنتم خير امة اخرجت للناس تأمرون بالمعروف وتنهون عن المنكر وتؤمنون بالله..»

(آل عمران: ١١٠)

"You are the best nation ever brought forth to men, bidding to honour, and forbidding dishonour, and believing in God." (3:110)

Muslims are not permitted to destroy the earth or spread injustice and corruption upon the earth. They are asked to dwell in it in manner desired by God:

«... هوأنشأكم من الارض واستعمركم فيها...» (هود:٦١)

"He brought you forth from the earth and hath made you to dwell in it." (11:61)

They are supposed to reform it and bring order to it. Unfortunately Western science due to its misconceived philosophical notions has brought destruction in its wake and the knowledgeable and powerful scientists of our time fit the description in the following verse of the Holy Quran:

«واذا تولى سعى في الارض ليفسد فيها ويهلك الحرث والنسل والله لا يحب الفساد (البقرة:٢٠٥)

"And whenever he prevails, he hastens, about the earth, to do corruption there and to destroy the tillage and the stock: and God does not love corruption." (2:205)

The story of Adam, in the Quran, while illustrating the superiority of man, due to his being vicegerent of God and his knowledge of the "names" (asma).warns us of the dangers that face him whenever he violates God's commandments. Man is appointed as the vicegerent of God on earth in order to reform it,to see the signs of God,and to become representative of His Power and Wisdom.

IV) In the school and universities of the Islamic countries, sufficient attention should be paid to the problem of moral purification of students and they ought to be instructed in virtuous actions. It is only then that the graduates of schools and universities will be both faithful and knowledgeable, and it is with this kind of scientists that order can be brought to our world and the well-known saying of Imam Ali exemplified:

وبالايمان يعمر العلم.

"Knowledge prospers through faith."[26]

Knowledge without faith does not produce anything better than what Western civilization has produced, and the faithless scientists have no aim but position, power, and wealth. Imam Khomeini has justly said:

"All of these tools that are made for the destruction of mankind and all of the advances that are made in the field of weaponry are the products of university graduates who have not been morally trained and who have not purified their souls."

The Holy Quran itself, when talking about the Prophet's message, mentions spiritual training to be compulsory for learning:

«كما ارسلنا فيكم رسولا منكم يتلوا عليكم آياتنا ويزكيكم ويعلمكم الكتاب والحكمة..»

(البقرة:١٥١)

"As also we have sent among you, of yourselves, a Messenger, to recite Our signs to you and to purify you, and to teach you the Book and the Wisdom." (2:151)

«ويعلمهم الكتاب والحكمة ويزكيهم..» (البقرة:١٢٩)

"... and teach them with the Book and the Wisdom.. and purify them" (2:129)

«هو الذي بعث في الاميين رسولا منهم يتلوا عليهم آياته ويزكيهم ويعلمهم الكتاب والحكمة..»

(الجمعة: ٢)

"It is He Who has raised up among the illiterates a Messenger among themselves, to recite His signs to them, and to purify them, and to teach them the Book and the Wisdom..." (62:2)

Muslim scholars, too, used to recommend to their students to have spiritual training, and in seeking knowledge not to go after position, power, or wealth. Muhammad ibn Zakariyya al-Razi, when mentioning the qualifications of medical students, says:

"It is urgent that a medical student should not learn medicine for the sake of becoming wealthy. Rather, he should know that the closest people to God are those who are the most leaned, the justest, and the kindest toward other people."[27]

In short, inorder to secure the spiritual as well as the material welfare of an Islamic society, it is essential to have learning tied with spiritual training.

V) The Holy Quran calls the followers of Islam a justly balanced nation:

«وكذلك جعلناكم امة وسطا لتكونوا شهداء على الناس..» (البقرة: ١٤٣)

"Thus we have made of you a justly balanced nation that you might be witnesses over the nation..." (2:143)

And it recommends them to maintain equilibrium between the spiritual and the material dimensions of life:

«ربنا آتنا في الدنيا حسنة وفي الآخرة حسنة..» (البقرة: ٢٠١)

"Our Lord, grant us good in this world and good in the hereafter." (2:201)

«وابتغ فيما آتاك الله الدار الاخرة ولا تنس نصيبك من الدنيا» (القصص: ٧٧)

'And seek by means of what Allah has given you the future abode, and do not neglect your portion of this world." (28:77)

Therefore, Muslims should not, like western people, become deeply involved in material aspects of life, and should not forget the spiritual dimensions of existence. Muslims should be aware of the fact that in Islamic outlook all material opportunities are permissible but not as an end in themselves. They serve as a ladder for the spiritual progress of man.

Muslims should never forget that Islam is radically opposed to the materialistic approach in the acquisition of science and technology and stresses that they should not be sought for their own sake. This does not in any way delimit the scope of empirical knowledge. It only means that, in making progress in this area, they should always remember God and seek His proximity as a primary goal.

In short, today we face two realities: on the one hand we see that the West has progressed in various fields of science and technology tremendously, and on the other hand, this material progress has not brought satisfaction to the Western man. It has rather drawn him to the pitfall of nihilism, and in fact it has brought mankind to the verge of total annihilation. Under these circumstances, the duty of Muslims is to compensate for their lag in the fields of science and

technology, and, by reviving Islamic teachings and the prevailing Islamic outlook, they can guide humanity toward real welfare and happiness.

Notes and Sources

1- Kulayani, **al-Kafi,** Vol. 1, P. 30; Ibn Majah, **Sunan,** Vol. 1, Introduction, section 17, No. 224.

2- Abu Hamid Muhammad Ghazzali **Ihya' 'Ulum al-Din,** Vol. 1, P. 14; Muhammad Baqir Majlisi, **Bihar al-Anwar, Vol. 1, 180.**

3- Sayyid Hasan Shirazi, Kalimah al-Rasul al-A'zam, P. 203.

In **al-Khisal** (Vol. 2, P. 433), Saduq reports that, while our Prophet (S) was describing the characteristic of wise men, he said:

«... لايسأم من طلب العلم طول عمره...»

"A wise man does not become tired of seeking knowledge throughout his lifetime."

4- Kulayni **al-Kafi,** Vol. 1, P. 32; Ibn Majah, **Sunan,** under No. 223; Abu Dawud al-Sijustani, **Sunan,** Vol. 2, P. 285.

5- Sayuti, **al-Jami' al-Saghir** (Damascus, 1352 H) Vol. 2, P. 657; see also Majlisi, **Bihar al-Anwar,** Vol. 2, P. 16.

6- Majlisi, **Bihar al-Anwar,** Vol. 3, PP. 82-83.

7- Ibn Majah, **Sunan,** Introduction, section 23, No. 250; Sayuti **al-Jami' al-Saghir,** Vol. 1, P. 185. In another well-known quotation from our Holy Prophet (S) we read:

(نعوذ بالله من علم لاينفع)

"We seek refuge to God from useless knowledge"

(Majlisi, **Bihar al-Anwar,** Vol. 2, P. 32; Ghazzali, **Ihya al-'Ulum al-Din,** Vol. 1, P. 2)

8- Harrani, **Tuhaf al-'Uqul** (Qum, 1394 H) PP. 249-250

9- R. Levy, **The Social Structure of Islam** (Cambridge, 1975) P. 400

10- G. Sarton, **Introduction to the History of Science,** Vol. 1 (Persian translation), P. 23.

11- Abu Rayhan al-Biruni **Kitab Tahdid Nihayat al-Amakin,** Persian translation (by A. Aram), PP. 3-4.

12- Abu Rayhan al-Biruni, **Kitab al-Jamahir** (Hyderabad, 1935). P. 5.

13- Ibn Abi Usaybiyah, **Tabaqat al-Atibba** (Beirut, 1965) P. 552.

14- al-Saduq, **Man la Yahduruh al-Faqih** (Tehran Ed), Vol. 4. P. 334. In Bukhari's **al-Sahih** (chapter on funeral rites) this tradition is reported in the following form:

م يعلوا ولا يعلى

which has same meaning as the one we quoted in the article.

15- M.J. Mughniyah, **al-Tafsir al-Kashif,** Vol. 2, P. 465.

16- Ibn Ikhvah, **Kitab Ma'alim al-Qurbah fi Ahkam al-Hisbah** (egypt, 1976), P. 254.

17- M.J. Mughniah, **al-Fiqh are al-Mazaheb al-Khamsah** (Beirut) P. 499.

18- These statistics are taken from several papers presented (Nov. 1983) at the:

"International Conference on Science in Islamic Polity" held at Islamabad in Novermber, 1983.

19- Imam Khomeini, **Tahrir al-Wasilah,** Vol. 1, P. 485.

20- Shaykh Zayn al-Din Al-'Amili **Munyah al-Murid** (Qum) P. 45.

21- Sayyid Qutb, **Fi Zilal al-Quran,** Vol. 2, PP. 560-561.

22- Muhammad Baqir Majlisi, **Bihar al-Anwar,** Vol. 2, P. 99; Sayuti, **al-Jami' al-Saghir,** Vol. 2, P. 255.

23- Muhammad Baqir Majlisi, **Bihar al-Anwar,** Vol. 2, P. 105.

24- 'Amidi, **Ghurar al-Hikam wa Durar al-Kalim** (Tehran University Press) Vol. 3, P. 408

25- Ibn 'Abd al-Bar, **Jami' Bayan al-'Ilm,** Vol. 1, P. 121, Majlisi, **Bihar al-Anwar** (Vol. 2, P. 97), reports a simila

quotation from Imam 'Ali in the following form:

«الحكمة ضالّة المؤمن فاطلبوها ولو عند المشرك ، تكونوا أحقّ بها وأهلها».

"Wisdom is a lost objective of believers; search for it even if it is in the polytheist's possession, because you deserve to have it more than they do."

26- **Nahj al-Balaghah** (S. al-Saleh -Ed) P. 393

27- Muhammad ibn Zakariyya al-Razi, **Rasa'il Falsafiyyah** (Cairo, 1939) P. 108.

PART 3

PHILOSOPHY OF SCIENCE: A QURANIC APPROACH

In the Name of God, the Merciful, the Beneficient

I— The Aim of Understanding Nature

Nature means the physical world, that is, the world with which we come into contact through our senses. In the Holy Quran, there are more than 750 verses in reference to the natural phenomena. In most of these verses, the study of the book of creation and the meditation upon its contents has been recommended. As confirmed by many outstanding Islamic scholars, the Quran is not a book of natural science, but rather one of guidance and enlightenment. The Quranic reference to the natural phenomena is meant to call man's attention to the might and glory of the Wise Creator of the universe through quest and meditation upon the natural beings and to encourage him to strive to be in close proximity to Him.

From the viewpoint of the Quran, natural phenomena are signs of the Almighty, and any understanding of nature is analogous with understanding the signs through which we attain cognition of the Lord of signs:

«ومن آياته ان خلق لكم من انفسكم ازواجاً لتسكنوا اليها وجعل بينكم مودّة ورحمة، انّ فی ذلك لآيات لقوم يتفكّرون» (الروم/٢١)

"And one of the signs is that He created mates for you from yourselves that you may find rest in them, and He put between you love and compassion, most surely there are signs in this for a people who reflect." (30:21)

«ومن آياته يريكم البرق خوفاً وطمعاً و يُنزّلُ من السماء ماءً فيحی به الارض بعد موتها، انّ فی ذلك لآيات لقوم يعقلون» (الروم/٢٤)

"And one of His signs is that He shows you the lightening for fear and for hope and sends down water from the clouds, then gives life therewith to the earth after its death; most surely there are signs in this for a people who understand." (30:24)

«ومن آياته خلق السّموات والارض واختلاف السنتكم والوانكم، إنّ فی ذلك لآيات للعالمين» (الروم/٢٢)

"And one of His signs is the creation of the heavens and the earth and the diversity of your tongues and colours; most surely there are signs in this for the learned." (30:22)

From the Quranic viewpoint, understanding nature is not a fruitful undertaking except when it helps us to understand the Wise Creator of this world and to attain close proximity to Him. Understanding nature can promote man's insight towards the cognition of Allah and enables him to better utilize the gifts of Allah for his own eternal felicity and well-being.

The Possibility Of Understanding Nature

In the Quran, there are many verses inviting man to study nature:

«قل انظروا ماذا فى السمٰوات والأرض...» (يونس/١٠١)

"Say: Consider what is it that is in the heavens and the earth..." (10:101)

«وفى الارض آيات للموقنين وفى انفسكم افلا تبصرون» (الذاريات/٢٠—٢١)

"And in the earth there are signs for those who are sure; And in your own souls (too): Will you not then see?" (51:20-21)

«قل سيروا فى الارض فانظروا كيف بدأ الخلق...» (العنكبوت/٢٠)

"Say: Travel on the earth and see how He made the first creation." (29:20)

«فلينظر الانسان مِمَّ خلق...» (الطارق/٥)

"So let man consider of what he is created." (86:5)

These verses show that understanding nature is possible, otherwise He would not have recommended its study.

From the following verses too, we realize that man has been endowed with the talent of cognition, and he has to exploit this- faculty to the best of his ability:

«وعلّم آدم الاسماء كلّها...» (البقرة/٣١)

"And He taught Adam all the names." (2:31)

«علّم الانسان مالم يعلم» (العلق/٥)

"Taught man what (he) knew not." (96:5)

«والله اخرجكم من بطون امّهاتكم لا تعلمون شيئاً وجعل لكم السمع والابصار والافئدة لعلكم تشكرون» (النحل/٧٨)

"And Allah has brought you forth from the wombs of your mothers-you did not know anything-and He gave you the hearing and the sight and the hearts that you give thanks." (16:78)

Moreover, the Quran promises:

«سنريهم آياتنا في الآفاق وفي انفسهم حتّى يتبيّن انّه الحق...» (فصلت/٥٣)

"We will soon show them Our signs in the universe and in their own souls, so that it will become clear unto them that He is indeed the truth." (41:53)

«وقل الحمدلله سيريكم آياته فتعرفونها وما ربكّ بغافل عمّا تعملون» (النمل/٩٣)

"And say: Praise be to Allah, He will show you His signs so that you shall recognise them; nor is your Lord heedless of what you do." (27:93)

These verses indicate that human beings will eventually come to have a better understanding of the truth about the universe.

III- The Main Issues In Understanding Nature:

Although from the viewpoint of the Quran, the ultimate goal in understanding nature is to comprehend and approach God, yet there are certain subsidiary goals, the apprehension of which may be considered as preliminary steps towards that ultimate goal.

These are the issues in connection with natural phenomena, and are pointed out in the Holy Quran. We are going to classify them into three groups:

1- Origin and Evolution of Beings and Phenomena

«اولم یرالذین کفروا انّ السمٰوات والارضَ کانتا رتقاً ففتقناهما وجعلنا من الماء کل شیٔ حیّ...»

(الانبیاء/۳۰)

"Do those who disbelieve not see that the heavens and the earth were closed up, but We have opened them, and have made of water everything living..." (21:30)

«الم تروا كيف خلق الله سبع سموات طباقاً وجعل القمر فيهن نوراً وجعل الشمس سراجاً» (نوح/١٥ــ١٦)

"Do you not see how God has created the seven heavens one above another, and made the moon therein a light, and made the sun a lamp?" (71:15)

«الذى احسن كل شئ خلقه وبدء خلق الانسان من طين، ثم جعل نسله من سلالة من ماء مهين، ثم سوّيه ونفخ فيه من روحه وجعل لكم السمع والابصار والافئدة قليلاً ماتشكرون» (السجده/٧ــ٩)

"...Who made good everything that He has created, and He began the creation of man from dust. Then He made his progeny of an extract of water held in light estimation. Then He made him complete and breathed into him of His spirit and made for you the earth, and the air and the hearts. Little is it that you give thanks." (32:7-9)

«افلا ينظرون الى الابل كيف خلقت والى السماء كيف رفعت والى الجبال كيف نصبت والى الارض كيف سطحت» (الغاشيه/١٧ــ٢٠)

"Will they not then consider the camel, how they are created and the heaven, how it is reared aloft, and the mountains, how they are firmly fixed, and the earth, how it is made a vast expanse?" (88:17)

All these verses indicate that we should attempt to discover the origin and evolution of beings, as this will help in enhancing man's faith and expediting his proximity to Allah.

In some verses of the Quran, certain natural phenomena are mentioned as indications of the Resurrection:

«اوليس الذى خلق السموات والارض بقادر على ان يخلق مثلهم بلى وهو الخلاق العليم» (يس/٨١)

"Is not He who created the heavens and the earth, able to create the like of them? Yea! And He is the Creator (of All), the Knower." (36:81)

«والله الذى ارسل الرياح فتثير سحاباً فسقناه الى بلدميّت فاحيينا به الارض بعد موتها، كذلك النشور» (فاطر/٩)

"And God is He who sends the winds so they rise a cloud, then we drive it on to a dead country, and therewith We give life to the earth after its death, even so is the uprising. (35:9)

«يا ايّها الناس ان كنتم فى ريب من البعث فانّا خلقناكم من تراب ثم من نطفه ثم من علقه... وترى الارض هامدة فاذا انزلنا عليها الماء اهتزت وربت وانبتت من كل زوج بهيج» (الحج/٥)

"O people! If you are in doubt about the Resurrection, then surely We created you from dust, then from a small life-germ, then from a clot, then from a lump of flesh, complete in make and incomplete... and you see the earth's sterile land, but when We send down on it the water, it stirs and swells and brings forth of every kind a beautiful herbage." (22:5)

2- The Discovery of Order, Co-ordination and Purpose in Nature:

Many of the verses in the Quran mention the existence of order, co-ordination, and purpose in nature as evidences confirming the existence of the Wise, Omniscient Creator. These verses can be classified into several groups:

a) Some verses specify that the creation of the heavens and the earth was not in vain, but had indeed some purpose behind it. For example:

«وهو الذى خلق السموات والأرض بالحق...» (الانعام/٧٣)

"And He it is Who has created heavens and the earth in truth..." (6:73)

«وما خلقنا السماء والارض وما بينها لاعبين» (الانبياء/١٦)

"And We did not create the heaven and the earth and what is between them for sport." (21:16)

«افحسبتم انّما خلقناكم عبثاً وانكم الينا لا ترجعون» (المؤمنون/١١٥)

"What! Did you then think that We had created you in vain and that you shall not be returned to Us?" (23:115)

b) It is mentioned in some verses that events follow a natural course for a certain pre-determined period:

«اولم يتفكروا فى انفسهم ما خلق الله السموات والارض وما بينها الاّ بالحق واجل مسمّىٰ وان كثيراً من الناس بلقاء ربهم لكافرون» (الروم/٨)

"Do they not reflect within themselves: Allah did not create the heaven and the earth and what is between them but in truth, and (for) an appointed term? And most surely most of the people are deniers of the meeting of their Lord." (30:8)

«الله الذى رفع السموات بغير عمد ترونها ثم استوى على العرش وسخّرالشمس والقمر كل يجرى لاجل مسمّى يدبّرُ الامر يفصّلُ الآيات لعلكم بلقاء ربكم توقنون» (الرعد/٢)

"Allah is He who raised the heavens without any pillars that you see, and He is firm in power, and He made the sun and the moon

subservient (to you); each one pursues its course to an appointed time; He regulates the affair, making clear the signs that you may be certain of meeting your Lord." (13:2)

c) Some verses tell us that the whole process of creation and the course of events in nature follow a proper reckoning and measure (that is, for everything there is a definite size and measure):

«والشمس والقمر بحسبان» (الرحمن/٥)

"The sun and moon follow a reckoning." (55:5)

«وان من شئ الاعندنا خزائنه وما ننزّله الابقدر معلوم» (الحجر/٢١)

"and there is not a thing but with Us are the treasures of it, and We do not send it down but in a known measure." (15:21)

«وكل شئ عنده بمقدار» (الرعد/٨)

"And there is a measure with Him of everything." (13:8)

«وخلق كل شئ فقدّره تقديراً» (الفرقان/٢)

"... He created everything then ordained for it a measure." (25:2)

«والسماء رفعها ووضع الميزان» (الرحمن/٧)

"And the heaven, He raised it high and He made the balance." (55:7)

«وأنبتنا فيها من كل شئ موزون» (الحجر/١٩)

"...And caused to grow in it of every suitable thing." (15:19)

It is precisely for the very existence of this order that laws of nature become significant. The scholars of natural science would not have so ardently pursued the discovery of these laws had they not been subconsciously aware of this very natural order.

From the above-mentioned verses and those ensuing, one can conclude that the discovery of order and co-ordination in nature (i.e. the laws of nature) and the certitude of God's handiwork is of great significance in understanding nature:

«هو الذى جعل الشمس ضياء والقمر نوراً وقدره منازل لتعلموا عدد السنين والحساب، ما خلق الله ذلك الاّ بالحق يفصّل الآيات لقوم يعلمون» (يونس/٥)

"He it is who made the sun a shining brightness and the moon a light, and ordained for it mansions that you might know the computation of years and reckoning. God did not create it but in truth; He makes the signs manifest for people who know." (10:5)

«... ما ترى فى خلق الرحمن من تفاوت فارجع البصر هل ترى من فطور» (الملك/٣)

"...You see no congruity in the creation of the Beneficient God; then look again, can you see any disorder?" (67:3)

3- Making a Legitimate Use of Natural Means Prepared by God (for man)

In a good number of verses God mentions the gifts He has granted man:

«وسخّر لكم ما فى السمٰوات وما فى الارض جميعاً...» (الجاثيه/١٣)

"And He has made subservient to you whatsoever is in the heavens and whatsoever is in the earth." (45:13)

«ولقد مكّنا كم فى الارض وجعلنا لكم فيا معايش قليلاً ما تشكرون» (الاعراف/١٠)

"And certainly We have established you in the earth and made in it means of livelihood for you, little it is that you give thanks." (7:10)

«ومن رحمته جعل لكم اللیل والنهار لتسكنوا فيه ولتبتغوا من فضله ولعلكم تشكرون» (القصص/٧٣)

"And out of His mercy He has made for you the night and day, that you may rest therein, and that you seek of His grace and that you give thanks." (28:73)

«ومن آياته ان يرسل الرياح مبشرات وليذيقكم من رحمته ولتجرى الفلك بامره ولتبتغوا من فضله ولعلكم تشكرون» (الروم/٤٦)

"And one of His signs is that He sends forth the winds bearing good news and that He may make you taste of His mercy, and that the ships may run by His command, and that you may seek of His grace, and that you may be grateful." (30:46)

«وهو الذى جعل لكم النجوم لتهتدوا بها فى ظلمات البرّ والبحر، قد فصّلنا الآيات لقوم يعلمون» (الانعام/٩٧)

"And He it is who has made the stars for you, that you might follow the right way thereby in the darkness of the land and the sea, truly We have made plain the communication for a people who know." (6:97)

In these verses, the reason for reminding man of Allah's blessings is to make him familiar with them, to urge him to

use them, and, to offer his thanks to Allah. Thanksgiving means to use God's blessings in the appropriate way for which they have been bestowed by the Almighty. It is thus important for the believer to make a conscientious use of Allah's bounties, leading society towards eternal felicity. Hence technology, which is the practical use of natural means, will be instrumental in realizing Divine goals.

Ways of Understanding Nature

Some Quranic verses tell us about the ways of understanding nature. We begin our discussion with a glorious verse:

«والله اخرجكم من بطون امهاتكم لا تعلمون شيئاً وجعل لكم السمع والابصار والافئدة لعلكم تشكرون» (النحل/٧٨)

"And God has brought you forth from the wombs of your mothers-you did not know anything-and He gave you the hearing and the sight and the hearts." (16:78)

It says that understanding is attained through eyes, ears and intellect. Here, from amongst external senses, only sight and hearing have been mentioned, because they are the main tools with the help of which one acquires knowledge of the physical world. However, one can deduce from the Holy Quran that the senses of taste, smell, and touch are also useful in giving us valuable information about the external world. Here we quote three verses:

«... فلما ذاقا الشجرة بدت لهما سوءاتهما وطفقا يخصفان عليهما من ورق الجنة...» (الاعراف: ٢٢)

"...So when they **tasted** *of the tree, their shameful parts became manifest to them, and they both began to cover themselves with the leaves of the garden..." (7:22)*

«ولما فصلت العير قال ابوهم انّي لاجد ريح يوسف لولا ان تفندون» (يوسف: ٩٤)

"And when the caravan had departed, their father said: Most surely I **smell** *the scent of Yusuf, unless you pronounce me to be weak in judgement." (12:94)*

«ولو نزلنا عليك كتاباً في قرطاس فلمسوه بايديهم لقال الذين كفروا ان هذا الاّ سحر مبين».
(الانعام: ٧)

"And if we had sent to you a writing on a paper, then they had ***touched*** *it with their hands, certainly those who disbelieve would have said: This is nothing but clear enchantment." (6:7)*

The word 'Fuw'ad (فؤاد) has been interpreted as a means of perception and reasoning. Heart has also been mentioned as a means of understanding and perception:

«افلم يسيروا في الارض فتكون لهم قلوب يعقلون بها...» (الحج/٤٦)

"Have they not travelled in the land so that they should have hearts with which to understand?" (22:46)

«... لهم قلوب لايفقهون بها...» (الاعراف/١٧٩)

"... They have hearts with which they do not understand..." (7:179)

«... وطبع على قلوبهم فهم لا يفقهون». (التوبة/٨٧)

"And a seal is set on their hearts so they do not understand." (9:87)

«انّ في ذلك لذكرى لمن كان له قلب...» (ق/٣٧)

"Most surely there is a reminder in this for him who has a heart." (50:37)

«اولئك الذين طبع الله على قلوبهم وسمعهم وابصارهم واولئك هم الغافلون» (النحل/١٠٨)

"These are they on whose hearts and hearing and eyes, God has set a seal and these are the heedless ones." (16:108)

In many Islamic works, too, "heart" has been said to be a tool of reasoning. It has been cited by Imam al-Sadiq (A.S) that:

«قلبها فلبه الذي به يعقل و يفقه و يفهم...»

"Among his organs is his heart which is the means of reasoning, erception and comprehension."[2]

It is also quoted from Imam 'Ali ibn Muhammad Taqi:

«دلّ القرآن واخبار الرسول(ص) ان القلب مالك لجميع الحواس يصحح افعالها ولا يبطل ما

القلب سي»[3]

he Quran and the Traditions of the Prophet (S) indicate that art' is the lord of all senses, and co-ordinates their deeds nctions); and whatever heart sets right nothing can spoil."[3]

Through the verses of the Quran, we intend to deduce

that the channels through which we understand nature are:

1- External senses (by means of which observation and experimentation take place)

2- Intellect, unpolluted of vices (dominant over desires and fancies, and free from blind imitation)

3- Revelation, and inspiration.

The Role of Observation and Reasoning in Understanding Nature:

There are a number of verses in the Holy Quran that encourage man to use his senses in search of truth. Here are some examples of those verses:

«قل سيروا فى الارض فانظروا كيف بدأ الخلق...» (العنكبوت/٢٠)

"Say: Travel on the earth and see how He made the first creation." (29:20)

«قل انظروا ماذا فى السموات والارض...» (يونس/١٠١)

"Say: Consider what is it that is in the heavens and the earth." (10:101

«افلا ينظرون الى الابل كيف خلقت» (الغاشيه/١٧)

"Will they not then consider the camels, how they are created (88:1

«أ لم يروا الى الارض كم انبتنا فيها من كل زوج كريم» (الشعراء/٧)

"Do they not see the earth, how many of every noble kind have caused to grow in it?" (26:7)

In these verses, observation and seeing (vision) imply "seeing with the help of right reasoning."[4] In a number of cases certain practical experiments are mentioned as means for acquiring knowledge. We are going to cite three examples of them:

a) Through a crow, Allah teaches Cain how to bury a dead body:

«فبعث الله غرابا يبحث في الارض ليريه كيف يواري سوأة اخيه. قال ياويلتى اعجزت ان اكون مثل هذا الغراب فاواري سوأة اخي فاصبح من النادمين» (المائده/٣١)

"Then God sent a crow,digging up the earth,so that He might show him (Cain) how he should cover the dead body of his brother. He said: Woe, me! Do I lack the strength that I should be like a crow and cover the dead body of my brother? So he became of those who regret." (5:31)

b) God teaches the rightful man the possibility of giving new life to the dead:

«اوكالذى مر على قرية وهي خاوية على عروشها قال أنّى يحيى هذه الله بعد موتها فأماته الله مائة عام ثم بعثه قال كم لبثت قال لبثت يوما او بعض يوم. قال بل لبثت مائة عام فانظر الى طعامك وشرابك لم يتسنّه وانظر الى حمارك ولنجعلك آية للناس وانظر الى العظام كيف ننشزها ثم نكسوها لحما فلماتبين له قال اعلم ان الله على كل شيء قدير» (البقره/٢٥٩)

"Or the like of him who passed by a town, and it had fallen down upon its roofs; he said: When will Allah give it life after its death? So Allah caused him to die for a hundred years, then raised him to life. He said: How long have you tarried? He said (in reply): I have tarried a day, or a part of a day. Said He: Nay! You have tarried a hundred years; then look at your food and drink-years have not passed over it; and look at your ass and that We may make you a sign to men, and look at the bones, how

We set them together, then clothed them with flesh; so when it became clear to him, he said: I know that Allah has power over all things." (2:259)

c) God shows Abraham how He gives life to the dead:

«واذا قال ابراهيم رب ارني كيف تحي الموتى قال اولم تؤمن قال بلى ولكن ليطمئن قلبي. قال فخذ اربعة من الطير فصرهن اليك ثم اجعل على كل جبل منهن جزءاً ثم ادعهن يأتينك سعيا واعلم ان الله عزيز حكيم» (البقرة/٢٦٠)

"And when Abraham said: My Lord show me how Thou givest life to the dead-He said: What! And do you not believe? He said: Yes, that my heart may be at ease. He said: Then take four of the birds, then train them to follow you, then place on every mountain a part of them, then call them, they will come to you flying; and know that Allah is Mighty, Wise." (2:260)

Besides, there are many tangible parables in the Quran which are meant to teach one something perceptible:

«مثل الذين ينفقون اموالهم في سبيل الله كمثل حبة انبتت سبع سنابل في كل سنبلة مائة حبة...» (البقرة/٢٦١)

"The parable of those who spend their property in the way of God is as the parable of a grain growing seven ears (with) a hundred grains in every ear." (2:261)

«ومثل كلمة خبيثة كشجرة خبيثة اجتثت من فوق الأرض ما لها من قرار» (ابراهيم/٢٦)

"And the parable of an evil word is as an evil tree pulled up from the earth's surface; it has no stability." (14:26)

لله نور السموات والارض، مثل نوره كمشكوة فيها مصباح المصباح في زجاجة الزجاجة كانها

كوكب دري ـ يوقد من شجرة مباركة زيتونة لا شرقية ولا غربية يكاد زيتها يضيء ولولم تمسسه نار نورعلى نور يهدي الله لنوره من يشاء و يضرب الله الامثال للناس والله بكل شيء عليم» (نور/٣٥)

"Allah is the light of the heavens and the earth; a likeness of his light is as a niche in which is a lamp, the lamp is in a glass, (and) the glass is as it were a brightly shining star, lit from a blessed olive-tree, neither eastern nor western, the oil whereof almost gives light though fire touch it not-light upon light-Allah guides to his light whom He pleases." (24:35)

«والله الذى ارسل الرياح فتثير سحاباً فسقناه الى بلدميت، فاحيينا به الارض بعد موتها، كذلك النشور» (فاطر/٩)

"And God is He Who sent the winds so they rise a cloud, then We drive it on to a dead country and therewith We give life to the earth after its death, even so is the quickening." (35:9)

Therefore, there is no doubt that the Quran considers external senses the primary tools in getting a part of our knowledge; but both in the above verses, and in many others to come, sensory stimuli have not been suggested as the sole source of nature's cognition. In order to substantiate this claim we can advance the following arguments:

1- In most of the Quranic verses, wherever natural phenomena are mentioned, it is explicitly pointed out that the perception of Divine signs in nature and their relation to the Lord of signs is within the reach of men of intellect, capable of reflection. Here are a few examples of such verses:

«هو الذى انزل من السماء ماءً لكم منه شراب ومنه شجر فيه تسيمون، ينبت لكم به الزرع والزيتون والنخيل والاعناب ومن كل الثمرات ان فى ذلك لآية لقوم يتفكرون» (النحل/١٠ـ١١)

"He it is who sends down water from the heaven (cloud) for you, it gives drink, and by it (grow) the trees upon which you pasture.

He causes to grow for you thereby herbage, and the olives and the palm trees, and the grapes and of all the fruits, most surely there is a sign in this for a people who reflect." (16:10-11)

«وهو الذی جعل لکم النجوم لتهتدوا بها فی ظلمات البرّ والبحر، قد فصّلنا لآیات لقوم یعلمون» (الانعام/۹۷)

"And He is it Who made the stars for you that you might follow the right way thereby in the darkness of the land and the sea. Truly We have made plain the communications for a people who know." (6:97)

«وسخّر لکم اللیل والنهار والشمس والقمر والنجوم مسخرات بامره، انّ فی ذلك لآیات لقوم یعقلون» (النحل/۱۲)

"And He has made subservient for you the night and the day and the sun and the moon and the stars are subservient by His commandment; most surely there are signs in these for a people who ponder." (16:12)

«ومن کل شیء خلقنا زوجین لعلکم تذکرون» (الذاریات/٤٩)

"And of every thing We have created pairs that you may be mindful." (51:49)

«الم تر ان الله انزل من السماء ماء فسلکه ینابیع فی الارض، ثم یخرج به زرعاً مختلفاً الوانه ثم یهیج فتریٰه مصفرا ثم یجعله حطاماً، انّ فی ذلك لذکری لاولی الالباب» (الزمر/۲۱)

"Do you not see that God sends down water from the cloud, then makes it go along in the earth in springs, then brings forth therewith herbage of various colours, when it withers so that you see it becoming yellow, then He makes it a thing crushed

and broken into pieces? Most surely there is a reminder in these for the men of understanding." (39:21)

«وهو الذى أنشأكم من نفس واحدة، فمستقر ومستودع، قد فصلنا الآيات لقوم يفقهون»

(الانعام/٩٨)

"And He it is Who has brought you into being from a single soul, then there is (for you) a resting place and a depository indeed. We have made plain the communications for a people who understand." (6:99)

The use of such words as **"Tafakkur, Ta'aqqul** and **Tafaqquh..."** in the above verses indicate (with different shades of emphasis) that to understand nature, one should make use of one's intellect.

The word "tafakkur" (meditation) in many of the verses means reflection on existing information and moving towards fresh awareness.[5]

(a)The words **"Ta'aqqul** and **Tafaqquh"** show the intellectual advancement. Therefore the cognition that originates through the senses should be backed by reflection and reasoning in order to enhance our knowledge.The following quotations from Imam al-Sadiq (AS)confirm this point:

«ان اول الامور ومبدأها وقوتها وعمارتها التى لاينتفع بشيء الابه، العقل الذى جعله الله زينة لخلقه ونوراً لهم، فبالعقل عرف العباد خالقهم، وانهم مخلوقون، انه المدبر لهم وانهم المدبرون... واستدلوا بعقولهم على ماراًوا من خلقه، ومن سمائه وارضه، وشمسه وقمره، وليله ونهاره، وبان له ولهم خالقاً ومدبراً لم يزل ولايزول، وعرفوا به الحسن من القبيح، وان الظلمة فى الجهل، وان النور فى العلم، فهذا مادلهم عليه العقل.»

"The origin and commencement of everything, and the cause of their flourishing is the intellect, without which nothing

can be achieved. God has endowed His servants with the light and ornamant of intellect.

By means of intellect the servants know their Creator and get to understand that He is the Ruler and they are under His rule. He is immortal and they are mortal. Their intellect directs them to infer through the observation of the handiwork of God-such as the heavens, the earth, the sun, the moon, the day and night... – That there is a Creator and controller of all these beings, and He has always been and will exist forever. It is through the intellect that man recognizes grace from disgrace, and realizes that light is associated with knowledge, and ignorance bears darkness. This inference can be made only through the intellect."[7]

(b) Sheykh Mufid in his book **al-Irshad** narrates that Abu Shakir Daysani said to Imam al-Sadiq (A.S): "You know that we do not accept anything unless we see, hear, taste, smell or feel it with our senses."

Imam al-Sadiq (A.S) answered:

ذكرت الحواس الخمس وهي لا تنفع في الاستنباط الأ بدليل، كما لا تقطع الظلمة بغير مصباح.

"You mentioned the five senses, but they never find the truth unless their findings are steered through the channel of intellect, in the same manner as darkness cannot be removed except with a lamp."

(c) There is another quotation from Imam al-Sadiq (A.S) which says:[8]

فانك لو رأيت حجراً يرتفع في الهواء، علمت ان راميأ رمى به، فليس هذا العلم من قبل البصر، بل من قبل العقل، لان العقل هوالذى يميّزه، فيعلم ان الحجر لايذهب علّواً تلقاء نفسه...»

"When you see a stone moving upwards in the air, you know that ***some person has thrown it.*** *This knowledge has not come to*

you through your eyes, but through the channel of intellect, because it is intellect which infers that ***a stone cannot go up in the air by itself.***"

Therefore, it can be concluded that though observation and experimentation are indispensible for obtaining information from the external world, they are not sufficient means. Should we rely solely on our external senses, we won't be able to interpret the physical world, and find the relation between natural events. In fact, man is no different from other animals as far as external senses are concerned, and some of the animals in this respect, are even better equipped than human beings. What distinguishes man from animals is his talent for profound observation of the world and the interpretation of events. And this is due to a faculty called rational faculty, which is capable of relating the signs and symbols, attained through the senses, and interpreting the universe. Senses give us a series of isolated signs and symbols, and intellect discovers their inter-relationship.

2- In the Quran, there are many verses denoting that in some people,eyes,ears and hearts do not perform their roles, and while seeing the Almighty's signs in nature, they do not meditate on them, nor do they benefit from those (blessings):

«وكاين من آية فى السموات والارض يمرّون عليها وهم عنها معرضون» (يوسف/١٠٥)

"*And how many a sign in the heavens and the earth they pass by, yet they turn aside from it.*" *(12:105)*

«... ثم قلوب لايفقهون بها ولهم اعين لايبصرون بها ولهم آذان لايسمعون بها...» (الاعراف/١٧٩)

"*...They have hearts with which they do not understand, and they have eyes with which they do not see, and they have ears with which they do not hear.*" *(7:179)*

«... ام لهم اعين يبصرون بها، ام لهم آذان يبصرون بها...» (الاعراف/١٩٥)

"...Or have they eyes with which they see, or have they ears with which they hear...?" (7:195)

«ولا تكونوا كالذين قالوا سمعناوهم لايسمعون» (الانفال/٢١)

"And be not like those who said, 'we hear', and they did not hear." (8:21)

«وان تدعوهم الى الهدى لايسمعوا وتريهم ينظرون اليك وهم لايبصرون» (الاعراف/١٩٨)

"And if you invite them to guidance, they do not hear, and you see them looking towards you, yet they do not see." (7:198)

«افلم يسيروا فى الارض فتكون لهم قلوب يعقلون بها او آذان يسمعون بها فانها لا تعمى الابصار ولكن تعمى القلوب التى فى الصدور» (الحج/٤٦)

"Have they not travelled in the land so that they should have hearts with which to understand, or ears with which to hear? For surely it is not eyes that are blind, but blind are the hearts which are in the breasts." (22:46)

It is quoted from our great Prophet (S) that:[9]

«ليس الاعمى من يعمى بصره، انما الاعمى من تعمى بصيرته»

"Blind is not a person who lacks eyes, but the one who lack insight."

Some people, interpreting the above verses, rightly sa that we have two kinds of sight and hearing-the physical o

external and spiritual or internal ones. The external organs of sight and hearing are tools for perception, and the internal ones serve for the appropriate use of those tools.

Imam Fakhr al-Din Razi refers to the following verse:

«مثل الفريقين كالاعمى والأصمّ والبصير» (هود/٢٤)

"the likeness of the two parties is as that of the blind and the deaf" (11:24)

and says:

"There is a similarity in the creation of body and spirit, that is, both have eyes and ears. In the same way that a deaf and blind person, in absolute silence and darkness, finds himself at a loss, an astray, irreligious and ignorant person's heart too, lacks the power of sight and hearing and he is lost in wilderness."[10]

We would rather interpret the above verses in this way: That eyes, ears and other external senses are means for the intellect; and their acquisitions could only be complete and meaningful if they go through the channel of the intellect. Eyes see, but the intellect interprets the result of sight and issues the verdict.[11] The function of sight can be considered complete when it goes with insight, i.e. when sensory is supplemented with (supra-sensory) intellect. Here are a few verses confirming this interpretation:[12]

«افانت تسمع الصم ولو كانوا لايعقلون» (يونس/٤٢)

"... But can you make the deaf to hear though they will not understand?" (10:42)

«ولا تكونوا كالذين قالوا سمعنا وهم لايسمعون. ان شرالدواب عندالله الصم البكم الذين لايعقلون» (الانفال ٢٠ـ٢٢)

"And be not like those who said, 'we hear', and they did not hear. Surely the vilest of animals in Allah's sight are the deaf, the dumb, who do not understand." (8:21-22)

It has been quoted from Imam 'Ali (A.S) in Nahj al-Balagha:[13]

«فانّ البصير من سمع فتفكر ونظر فابصر، وانتفع بالعبر ثم سلك جدداً واضحاً وتجنب الصرعة في المهاوي والضلال في المغاوي»

"The observer is one who reflects on what he has heard and reflects upon what he has seen, and makes use of his instructive experience in choosing to tread on clear paths wherein he can avoid falling into hallows and staying into pitfalls."

There is a statement narrated from Imam al-Sadiq (A.S):[14]

«زعمت ان الاشياء لا تدرك الابالحواس فانّي اخبرك انّه ليس للحواس دلالة على الاشياء ولا فيها معرفة الا بالقلب فانه دليلها ومعرّفها الاشياء التي تدّعي ان القلب لايعرفها الآبها... ان القلب يفكر بالعقل الذي فيه...

«ان الله تعالى جعل القلب مديرا للجسد، به يسمع وبه يبصر وهوالقاضي والامير عليه، وبه ينزل الفرح والحزن، وبه ينزل الالم، ان فسد شيء من الحواس بقي على حاله، وان فسد القلب ذهب جميعا - لايسمع ولايبصر»"

"... You thought things could not be felt except through senses. Let me advise you that senses do not directly lead you to objects, and we know objects only through the channel of heart, therefore, it is heart which directs the senses and present objects to the senses, the objects that you (mistakenly) claim ar not known to the heart but through senses... Heart reflects b the intellect which it possesses.

The Almighty God made heart the administrator of the body and it hears and sees through the heart. Heart is the judge and ruler of the body. Should heart delay, the body cannot proceed, should it proceed the body cannot tarry.

Senses see and hear through the heart; should it order senses, they obey; should it hinder them, they stop. Happiness and sorrow, too, befall man through the heart and make him endure them. If senses fail and decay, heart goes on functioning; but with the decay of heart all the senses disappear– man neither sees nor hears."

3- The Quranic verses indicate that in addition to sense-rooted cognitions, there are non-sensory cognitions, too. These verses fall into two groups:

(a) In one group of the verses Allah refutes the arguments of the people who consider their external senses as the only reliable source for their knowledge:

«واذ قلتم يا موسى لن نؤمن لك حتى نرى الله جهرةً، فاخذتكم الصاعقه وانتم تنظرون» (البقره/٥٥)

"And when you said:O Musa! We will not believe in you until we see Allah manifestly, so the punishment overtook you while you looked on." (2:55)

«وقالوا لن نؤمن لك حتى تفجر لنا من الارض ينبوعاً، او تكون لك جنة من نخيل وعنب فتفجر الانهار خلالها تفجيراً، او تسقط السماء كما زعمت علينا كسفاً اوتأتي بالله والملائكه قبيلاً، او يكون لك بيت من زخرف، اوترقى في السماء، ولن نؤمن لرقيّك حتى تنزّل علينا كتاباً نقرؤه. قل سبحان ربي هل كنت الاّ بشراً رسولاً» (الاسراء/٩٠ـ٩٣)

"And they said: 'We will by no means believe in you until you cause a fountain to gush forth from the earth for us.'

'Or you should have a garden of palms and grapes in the midst of which you should cause rivers to flow forth gushing out.'

'Or you should cause the heaven to come down upon us in pieces as you think, or bring Allah and the angels face to face (with us)'

'Or you should have a house of gold, or you should ascend into heaven, and we will not believe in your ascending until you bring down to us a book which we may read.'

'Say: Glory be to my Lord. Am I aught but a mortal apostle?" (17:90-93)

«يعلمون ظاهراً من الحيوٰة الدنيا وهم عن الآخرة هم غافلون» (الروم/٧)

"They know the outward of this world's life, but of the hereafter they are absolutely heedless." (30:7)

(b) The Quran repeatedly reminds us that we do not perceive many of the realities of the physical world through external senses:

«الله الذي رفع السمٰوات بغير عمد ترونها...» (الرعد/٢)

"Allah is He who raised the heavens without any pillars..." (13:2)

فلا قسم بما تبصرون وما لا تبصرون (الحاقة/٣٨ــ٣٩)

"But nay! I swear by that which you see, and that which you see not." (69:38-39)

«سبحان الذي خلق الازواج كلها مما تنبت الارض ومن انفسهم ومما لايعلمون...»

(يس/٣٦)

"Glory be to Him who created pairs of all things, of what

the earth grows, and of their kind and of what they do not know." (36:36)

And we also learn from the Quran that only Allah is aware of the mysteries in the heavens and the earth, and those to whom Allah has granted this bliss:

«ولله غيب السموات والارض واليه يرجع الامركله»
(هود/١٢٣)

."And Allah's is the unseen in the heavens and the earth and to Him is returned the whole of the affair." (11:123)

«قل الله اعلم بما لبثوا له غيب السموات والارض...» (الكهف/٢٦)

"Say; Allah knows best how long they remained: To Him are (known) the unseen things of the heavens and the earth." (18:26)

«ان الله يعلم غيب السموات والارض والله بصير بما تعملون» (الحجرات/١٨)

"Surely Allah knows the unseen things of the heavens and the earth; and Allah sees what you do." (49:18)

«عالم الغيب فلا يظهر على غيبه احداً الأ من ارتضى من رسول...» (الجن/٢٦ـ٢٧)

"The knower of the unseen. So He does not reveal His secrets to any except to him who He regards as an apostle." (72:26-27)

Unfortunately, in recent centuries, some Muslim scholars have wrongly propounded the view that experiments are the only means to acquire knowledge, and the

experimental study of the book of nature suffices to know God.[15]

We, too, agree that experiment and observation are indispensible tools to understand nature. We even believe that the Muslims' work in this field has been quite inadequate. But we also believe that our understanding of nature is not purely a matter of the senses. Besides, our observations and experiments cannot be the source of any knowledge unless they are channelized via the intellectual principles.

In the matter of scientific cognition of God, we are of the same opinion that martyred professor Murtada Mutahhari expressed:

"The boundary of experiment is only the cognition of the works of God, but the cognition of God through the works known by experiment is a kind of pure intellectual deduction."[16]

The reason is obvious: there are many who perform experiments, but they do not attain the cognition of God.

Science only nominally consists of issues verifiable by experimental methods. Many issues have not directly resulted from experiment. In fact, one may say that in all natural sciences, our knowledge is mainly based on deduction, and we have not obtained any of the rules and laws in physics or chemistry directly from experiment, but they are based on intellectual deductions. The matter itself has come to be known through intellectual deduction because experiments in physics or chemistry provide us only with the properties of matter.

This view, that most of our knowledge on the physical world has come through intellectual deduction, is not shared by most scholars in natural sciences in recent years. But as Albert Einstein[17] rightfuly advised, we had better not listen to what physicists say, but rather see what they do. The fact is that many of the scientists with positivistic views, have overlooked their own claims. Moreover, among Western scholars in natural sciences, we find some outstanding figures

who admit the decisive role of intellectual deductions and interpretation in our knowledge of natural phenomena. Max Planck in a paper titled "The Scientist's Picture of the Physical World" says:[18]

"The ideal aim before the mind of the physicist is to understand the external world of reality. But the means which he uses to attain this end are what are known in physical science as 'measurements', and these give no direct information about external reality. They are only a register or representation of reactions to physical phenomena. As such they contain no explicit information and have to be interpreted. As Helmhotlz said, measurements furnish the physicist with a sign which he must interpret, just as a language expert interprets the text of some prehistoric document that belongs to a culture utterly unknown. The first thing which the language expert assumes— and must assume if his work is to have any practical meaning— is that the document in question contains some reasonable message which has been stated according to some system of grammatical rules or symbols. In the same way the physicist must assume that the physical universe is governed by some system of laws which can be understood, even though he cannot hold out himself the prospect of being able to understand them in a comprehensive way or to discover their character and manner of operation with anything like a full degree of certitude.

"Taking it, then, that the external world of reality is governed by a system of laws, the physicist now constructs a synthesis of concepts and theorems; and this synthesis is called the scientific picture of the physical universe. It is a representation of the real world itself in so far as it corresponds as closely as possible to the information which the research measurements have supplied. Once he has accomplished this, the researcher can assert, without having to fear the contradiction of facts, that he has discovered one side of the outer world of reality, though of course he can never logically demonstrate the truth of the assertion."

In a lecture, delivered by Einstein at Oxford University in 1933, under the title of "On Methods of Theoretical Physics", he said:[19]

"Newton, the first creator of a comprehensive, workable system of theoretical physics, still believed that the basic concepts and laws of his system could be derived from experience. This is no doubt the meaning of his saying, 'hypotheses non fingo'.

"Actually the concepts of time and space appeared at that time to present no difficulties. The concepts of mass, inertia, and force, and the laws connecting them, seemed to be drawn directly from experience. Once this basis is accepted, the expression for the force of gravitation appears derivable from experience, and it was reasonable to expect the same in regard to other forces.

"We can indeed see from Newton's formulation of it that the concept of absolute space, which comprised that of absolute rest, made him feel uncomfortable; he realized that there seemed to be nothing in experience corresponding to this last concept. He was also not quite comfortable about the introduction of forces operating at a distance. But the tremendous partial success of his doctrines may well have prevented him and the physicists of the eighteenth and nineteenth centuries from recognizing the fictitious character of the foundations of his system.

"The natural philosophers of those days were, on the contrary, most of them possessed with the idea that the fundamental concepts and postulates of physics were not in the logical sense, free inventions of the human mind, but could be deduced from experience by 'abstraction' —that is to say, by logical means. A clear recognition of the erroneousness of this notion really only came with the general theory of relativity, which showed that one could take account of wider range of empirical facts, and that, too, in a more satisfactory and complete manner, on a foundation quite different from the Newtonian. But quite apart from the question of the superiority of one or the other, the fictitious

character of fundamental principles is perfectly evident from the fact that we can point to two essentially different principles, both of which correspond with experience to a large extent; this proves at the same time that every attempt at a logical deduction of the basic concepts and postulates of mechanics from elementary experiences is doomed to failure.

"If, then, it is true that the axiomatic basis of theoretical physics cannot be extracted from experience but must be freely invented, can we ever hope to find the right way? Nay, more, has this right way any existence outside our illusions? Can we hope to be guided safely by experience at all when there exist theories (such as classical mechanics) which to a large extent do justice to experience, without getting to the root of the matter? I answer without hesitation that there is, in my opinion, a right way, and that we are capable of finding it. Our experience hitherto justifies us in believing that nature is the realization of the simplest conceivable mathematical ideas. I am convinced that we can discover by means of purely mathematical constructions, the concepts and the laws connecting them with each other, which furnish the key to the understanding of natural phenomena. Experience may suggest the appropriate mathematical concepts, but they most certainly cannot be deduced from it. Experience remains, of course, the sole criterion of the physical utility of a mathematical construction. But the creative principle resides in mathematics. In a certain sense, therefore, I hold it true that pure thought can grasp reality, as the ancients dreamed."

In his book **"Physics and Beyond"**, Heisenberg writes[20] that in the year 1926 he was of the opinion that Einstein still believed in the positivistic view of Mach, that is, he believed that only observable quantities should be included in physical theories. Therefore, when Einstein said, 'but you do not seriously believe that none but observable magnitudes must go into a physical theory?', Heisenberg asked in some surprise: "Isn't that precisely what you have done with relativity?' ... After all, you did stress the fact that it is

impermissible to speak of absolute time, simply because absolute time cannot be observed; that only clock readings, be it in the moving reference system or the system at rest, are relevant to the determination of time."

Einstein then admitted:

"Possibly I did use this kind of reasoning but it is nonsense all the same. Perhaps I could put it more diplomatically by saying that it may be heuristically useful to keep in mind what one has actually observed. But, in principle, it is quite wrong to try founding a theory on observable magnitudes alone. In reality the very opposite happens. It is the theory which decides what we can observe."

Phillip Frank in his biography of Einstein says[21] that he once told Einstein that he himself had introduced the positivistic view into physics. Einstein answered: "A good joke should not be repeated too often."

Our purpose in citing these quotations is to point out that many of the recent outstanding research scholars have been fully aware of the inadequacy of experiments for the interpretation of nature. Otherwise, we do not doubt the importance and indispensibility of experiments and Muslim researchers should not forget the message carried in such verses:

«قل سيروا في الارض فانظروا كيف بدأ الخلق...»

(العنكبوت/٢٠)

"Say: Travel in the earth and see how He made the first creation..." (29:20)

«قل انظروا ما ذا في السموات والارض...»

(يونس/١٠١)

"Say: Consider what is it that is in the heavens and the earth..." (10:101)

We should also bear in mind that while the Quran invites us to experimental study of nature, it also points out the importance of meditation and reasoning, and teaches us not to be satisfied with mere sensory experience, but by observing what is beyond the observable part of nature, we move closer to the Creator of nature.

The Role of Revelation and Inspiration in Understanding Nature:

It is deduced from some verses in the Quran that the true teacher of all sciences is the Omniscient:

«اقرأ باسم ربك الذي خلق.. الذي علم بالقلم * علم الانسان ما لم يعلم»

(العلق/١—٥)

"Read in the Name of your Lord who created... who taught (to write) with the pen. Taught man what he knew not." (96:1-5)

«خلق الانسان، علّمه البيان» (الرحمن/٣—٤)

"He created man, and taught him to talk." (55:3-4)

«وعلّم آدم الاسماء كلّها...» (البقرة/٣١)

"And taught Adam all the Names,..." (2:31)

The least we can infer from these verses is that God has endowed man with talent to acquire knowledge and has given him the necessary means. But some Muslim philosophers believe that the role of observations in the perception of a-priori knowledge and the role of preliminary matters in the perception of theoretical subjects is to prepare man's soul to fully benefit from the spiritual world.[22]

In fact the main source of the inspiration in the matter of knowledge for human beings is the Omniscient Donor of knowledge, Allah. But the degree of relation between human beings and this Source differs from person to person. Some think and get nowhere, whereas some others find some truth through meditation; and yet there are some others who become aware of many realities with only little speculation.

Some Quranic verses indicate that besides ordinary channels of observation, meditation and intellection, there is a more direct way of attaining the knowledge of the realities of the world through the Donor of knowledge; but this way is not a general one and only the select believers pass through it. These verses may be divided into several groups.

1- It is stated in some verses that God reveals special knowledge to certain select believers:

«... وقتل داود جالوت وآتاه الله الملك والحكمة وعلّمه ممّا يشاء...» (البقرة/٢٥١)

"And Dawūd slew Jālūt, and God gave him kingdom and wisdom, and **taught** *him of what he pleased." (2:251)*

«ربّ قد آتيتني من الملك وعلّمتني من تأويل الاحاديث...» (يوسف/١٠١)

"My Lord. Thou hast given me of the kingdom and **taught** *me of the interpretation of sayings..." (12:101)*

«فوجدا عبداً من عبادنا آتيناه رحمة من عندنا وعلّمناه من لدُنّا علماً» (الكهف/٦٥)

"Then they found one from among Our servants whom We had granted mercy from Us and whom We had **taught** *knowledge from Ourselves." (18:65)*

«... اذ قال الله يا عيسى ابن مريم... واذ علّمتك الكتاب والحكمة والتوريٰة والانجيل...» (المائدة/١١٠)

"When God will say: O' Isa (Jesus Christ) son of Mariam (Mary). Remember My favour on you and on your mother, when I strengthened you with the Holy spirits, you spoke to the people in the cradle and when of old age, and when I **taught** *you the Book and the Wisdom and the Tawrah (Torah) and the Injil (Bible)." (5:110)*

«... وانّه لذوعلم لما علّمناه ولكن اكثر الناس لايعلمون» (يوسف/٦٨)

"And surely he was possessed of knowledge because We had **given** *him knowledge, but most people do not know." (12:68)*

«و داود وسليمان اذ يحكمان فى الحرث... ففهمناها سليمان وكلا آتينا حكماً وسخّرنا مع داود الجبال يسبّحن والطير وكنا فاعلين. وعلّمناه صنعة لبوس لكم لتحصنكم من بأسكم فهل انتم شاكرون» (الانبياء/٧٨ــ٨٠)

"And Dawũd (David) and Sulaiman (Solomon) when they gave judgement concerning the field when the people's sheep pastured therein by night, and we were bearer of witness to their judgement. So we made Sulaiman to understand it; and to each one We gave wisdom and knowledge; and We made the mountains, and the birds to celebrate Our praise with Davood; and We were the doers. And We **taught** *him the making of coats of mail for you, that they might protect you in your wars; Will you then be grateful?" (21:78-80)*

In some of the verses, the idea that this way of teaching can be accomplished through human teachers has been rejected:

«ان هو الاّ وحى يوحىٰ، علّمه شديد القوى» (النجم/٤ــ٥)

"It is naught but revelation that is revealed. The Lord of Mighty Power has taught him." (53:4-5)

«ولقد نعلم أنّهم يقولون انّما يُعلّمُه بشر...» (النحل/١٠٣)

"And certainly We know that they say: Only a mortal teaches him." (16:103)

«... وانزل الله عليك الكتاب والحكمة وعلّمك مالم تكن تعلم...» (النساء/١١٣)

"And God has revealed to you the Book and the wisdom, and He has taught you what you did not know." (4:113)

2- Another group of verses indicate revelation to prophets:

«ذلك ممّا اوحىٰ اليك ربك من الحكمة...» (الاسراء/٣٩)

"This is of what your Lord has revealed to you of wisdom." (17:39)

«فاوحى الى عبده ما اوحىٰ. ماكذّب الفؤاد مارأى» (النجم/١٠ــ١١)

"And He revealed to His servant what He revealed. His heart lies not of what he saw." (53:10-11)

«انّا اوحينا اليك كما اوحينا الى نوح والنبيين من بعده واوحينا الى ابراهيم واسمٰعيل واسحٰق و يعقوب والاسباط وعيسى وايوب و يونس وهرون وسليمان و آتينا داود زبورا» (النساء/١٦٣)

"Surely We have revealed to you as We revealed to Nüh (Noah), and the prophets after him, and We revealed to Ibrähïm (Abraham) and Ismai'il (Ismael) and Ishäq (Isaac) and Yaqüb (Jacob) and the tribes and 'Isä (Jesus Christ) and Ayyüb (Job) and Yünus (Jonah) and Härün (Aaron) and Sulaymän (Solomon) and We give to Däwüd (David) psalms." (4:163)

«واوحينا الى موسى ان الق عصاك فاذا هى تلقف ما يأفكون» (الاعراف/١١٧)

"And We revealed to Müsä (Moses) saying: Cast your rod, then lo! it devoured the lies they told." (7:117)

«اكان للناس عجبا ان اوحينا الى رجل منهم ان انذر الناس» (يونس/٢)

"What! Is it a wonder to the people that We revealed to a man from among themselves, saying: Warn the people...?" (10:2)

«واوحينا الى موسى واخيه ان تبوّءا لقومكما بمصر بيوتاً» (يونس/٨٧)

"And We revealed to Müsä and his brother, saying: Take for your people houses to abide in." (10:87)

«فاوحينا اليه ان اصنع الفلك...» (المؤمنون/٢٧)

"So We revealed to him saying: Make the Ark before..." (23:27)

«ذلك من انباء الغيب نوحيه اليك.....» (آل عمران/٤٤)

"This is of the announcements relating to the unseen which We reveal to you." (3:44)

«وما ارسلنا من قبلك الاّ رجالاً نوحي اليهم...» (النحل/٤٣)

"And We did not send before you any but men to whom We sent revelation." (16:43)

«قل انّما انا بشر مثلكم يوحىٰ الى...» (الكهف/١١٠)

"Say: I am only a mortal like you, it is Revealed to me..."
(18:110)

3- Yet another group of verses indicates the possibility of revelation for people other than prophets:

«واذ اوحيت الى الحواريين ان آمنوا بي وبرسولي، قالوا آمنّا واشهد بانّنا مسلمون» (المائده/١١١)

"And when I revealed to the disciples, saying, Believe in Me and My apostle, they said: We believe and bear witness that we submit (ourselves)." (5:111)

«واوحينا الى ام موسى ان ارضعيه...» (القصص/٧

"And we revealed to Musa's mother, saying: Give him suck. (28:7)

In this case, "revelation" is interpreted[23] as "inspiration". Of course, the revelation has been used in other senses as well.[24]

What we may conclude from these verses is the possibility of learning from the Donor of knowledge through a channel different from the common channel of observation and thinking. This, too, has different levels: The highest level of revelation is reserved for prophets only, and according to the glorious verse:

«وما كان لبشر ان يكلمه الله الاوحياً أومن وراء حجاب او يرسل رسولاً فيوحيٰ باذنه مايشاء...»
(الشورى/٥١)

"And it is not for any mortal that God should speak to him except by revelation or from behind a veil,
or by sending a messenger and revealing by His permission what He pleases..." .(42:51)

it is done through a direct inducement of the meaning in

the prophet's heart. Or by the creation of words or by sending an angel messenger to him.[25] On the lower levels, this is done through inspiration, which is variously termed as **Kashf** (کشف) **ilhām** (الهام).

Muslim philosophers believe that the people having talent for attaining such immediate knowledge are those who are endowed with a saintly faculty (قوه قدسیه). To explain their reasoning we take a look back, and see that one of the channels to cognition is (logical) thinking. In thinking, the mind undergoes a two- stage movement, and shuttles between the known and the unknown. In thinking one seeks a middle term that is common in both the given propositions with the help of which he hopes to understand the unknown. In general, finding the middle term requires certain premises. Yet in certain special cases some people may reach the middle term and the conclusion without forming a syllogism in their minds.[26] This mental talent which takes one to the goal without following logical steps is called 'intuition' (حدس) and in its highest form has been called 'the saintly faculty' (قوه قدسیه). A person having this gift can know many realities without the use of his sensory and rational faculties. Avecina in his "**al-Isharat**" says[27] that the following Quranic phrase refers to this special mental faculty:

«یکاد زیتها یضیء ولو لم تمسسه نار» (النور/۳۵)

"The oil where of almost gives light though fire touch it not..."(24:35)

and he confirms its existence in the following statements:[28]

"You may wish to have more evidence to prove the existence of the saintly faculty gift. So hark! Do you not know that 'intuition' exists, and people possess different levels of reflection and intuition. Some are so dull and stupid that they find no way to their goal; some others are

moderately intelligent and can make use of their reasoning power and some others, more intelligent, can perceive intelligibles through intuition. This intelligence differs from person to person; at the lowest level, man is completely deprived from intuition; at the highest level, one does not need to learn (through regular course) or think through logical categories (for knowing the reality).

Now we are in a position to say that in the same way that revelation has various degrees, as stated by the following verse:

«تلك الرسل فضلّنا بعضهم على بعض. منهم من كلّم الله ورفع بعضهم درجات وآتينا عيسى ابن مريم البينات وايدناه بروح القدس..» (البقرة/٢٥٣)

"We have made some of these apostles to excel the others; among them are they to whom God spoke, and some of them He exalted by (many) degrees of rank; and We gave clear miracles to Isa (Jesus) son of Maryam (Mary), and strengthened him with the Holy Spirit." (2:253)

"Inspiration, too, is of different levels- though on the whole it is lower than revelation. Some people enjoy this gift at its highest level and others possess it in its weaker forms. For the former, realities are made manifest without effort of reflection, while the latter attain new knowledge through their own endeavours. Some of the contemporary scholars have accepted the existence of this power. Dr. Alexis Carrel in his book **"Man, the Unknown"** says:[29]

"Obviously, great discoveries are not the product of intelligence alone. Men of genius, in addition to their powers of observation and comprehension, possess other qualities, such as intuition and creative imagination. Through intuition they learn things ignored by other men, they perceive relations between seemingly isolated phenomena. They unconsciously feel the presence of the unknown treasure. All great men are endowed with intuition. They know, without analysis, without reasoning, what is

important for them to know. A true leader of men does not need psychological tests, or reference cards, when choosing his subordinates. A good judge, without going into the details of legal arguments, and even, according to Cardozo, starting from erroneous premises, is capable of rendering a just sentence. A great scientist instinctively takes the path leading to a discovery. This phenomenon, in former times, was called inspiration.

"Men of science belong to two different types- the logical and the intuitive. Science owes its progress to both forms of mind. Mathematics, although a purely logical structure, nevertheless makes use of intuition. Among the mathematicians there are intuitives and logicians, analysts and geometricians. Hermitte and Weierstrass were intuitives. Riemann and Bertrand, logicians. The discoveries of intuition have always to be developed by logic. In ordinary life, as in science, intuition is a powerful but dangerous means of acquiring knowledge. Sometimes it can hardly be distinguished from illusion. Those who rely upon it entirely are liable to mistakes. It is far from being always trustworthy. But the great man, or the simple whose heart is pure, can be led by it to the summits of mental and spiritual life. It is a strange quality. To apprehend reality without the help of intelligence appears inexplicable. One of the aspects of intuition resembles a very rapid deduction from an instantaneous observation. The knowledge that great physicians sometimes possess concerning the present and the future state of their patients is of such a nature. A similar phenomenon occurs when one appraises in a flash a man's value, or senses his virtues and his vices. But under another aspect, intuition takes place quite independently of observation and reasoning. We may be led by it to our goal when we do not know how to attain this goal and even where it is located. This mode of knowledge is closely analogous to clairvoyance, to the sixth sense of Charles Richet."

Finally I would like to mention that though inspiration and enlightenment are means to attain knowledge, not

everybody receives this gift of light:

«ذلك فضل الله يؤتيه من يشاء...» (الجمعه/٤)

"That is God's grace; He grants it to whom He pleases." (62:4)

The only way which is open to everyone is the channel of observation and reflection while aiming at attaining the knowledge of nature. The conditions leading to proper result shall be discussed in a later part of our discourse.

Stages In Understanding Nature:

We have already seen that from the viewpoint of Quran man has the capacity to understand nature.

With the use of external senses and intellect, human beings should get closer to God through understanding Divine signs. Here we have to mention that wherever there is a reference in the Quran to the Divine evidences in the physical world, Allah attributes the ability of understanding them to special groups of people. Here are a few examples:

On Meditators:

«هوالذی انزل من السماء ماءً لکم، منه شراب ومنه شجر فیه تسیمون. ینبت لکم به الزرع والزیتون والنخیل والاعناب ومن کل الثرات ان فی ذلك لآیة لقوم یتفکرون» (النحل/۱۰ــ۱۱)

"He it is who sends down water from the cloud for you; it gives drink and by it (grow) the trees upon which you pasture.

He causes to grow for you thereby herbage, and the olive, and the palm tree, and the grapes, and of all the fruits, most surely there is a sign in this for a people who reflect." (16:10-11)

«وسخر لكم ما فى السمٰوات وما فى الارض جميعاً منه. انّ فى ذلك لآيات لقوم يتفكرون»
(الجاثية/١٣)

"And He has made subservient to you whatsoever is in the heavens and whatsoever is in the earth, all, from himself; most surely there are signs in this for a people who reflect." (45:13)

On the Wise:

«انّ فى خلق السموات والارض واختلاف اللیل والنهار والفلك الّتى تجرى فى البحر بما ينفع الناس وما انزل الله من السماء من ماء فاحيا به الارض بعد موتها وبث فيها من كلّ دابة وتصريف الرياح والسحاب المسخر بين السماء والارض لآيات لقوم يعقلون» (البقرة/١٦٤)

"Most surely in the creation of the heavens and the earth, the alternation of the night and the day, and the ships that run in the sea with that which profits men, and the water that Allah sends down from the cloud, then gives life with it to the earth after its death and spreads in it all (kinds of) animals, and the changing of the winds and the clouds made subservient between the heaven and the earth, there are signs for a people who ponder." (2:164)

«وسخر لكم اللیل والنهار والشمس والقمر والنجوم مسخرات بامره. انّ فى ذلك لآيات لقوم يعقلون»
(النحل/١٢)

"And He has made subservient for you the night and the day and the sun and the moon, and the stars are made

subservient by His commandment; most surely there are signs in this for a people who ponder." (16:12)

On the people who understand:

«انّ فی خلق السموات والارض واختلاف اللیل والنهار لآیات لاولی الالباب» (آل عمران/۱۹۰)

"Most surely in the creation of the heavens and the earth and the alternation of the night and the day there are signs for men who understand." (3:189)

الم تر ان الله انزل من السماء ماءً فسلکه ینابیع فی الارض ثم یخرج به زرعاً مختلفاً الوانه، ثم یهیج فتریٰه مصفراً ثم یجعله حطاماً. انّ فی ذلك لذکری لاولی الالباب.» (الزمر/۲۱)

"Do you not see that Allah sends down water from the cloud, then makes it go along in the earth in springs, then brings forth therewith herbage of various colours, then it withers so that you see it becoming yellow, then makes it a thing crushed and broken into pieces? Most surely there is a reminder in this for the men of understanding." (39:21)

On the Believers:

«انّ فی السموات والارض لآیات للمؤمنین» (الجاثیه ۳)

"Most surely in the heavens and the earth there are some signs for the believers." (45:3)

«الم یروا انّا جعلنا اللیل لیسکنوا فیه والنهار مبصراً. انّ فی ذلك لآیات لقوم یؤمنون» (النمل/۸٦)

"Do they not consider that we have made the night that they may rest therein, and the day to give light? Most surely

there are signs in this for a people who believe." (27:86)

On the Pious:

«انّ فی اختلاف اللیل والنهار وما خلق الله فی السموات والارض لآیات لقوم یتّقون» (یونس/٦)

"Most surely in the variation of the night and the day, and what Allah has created in the heavens and the earth, there are signs for a people who guard (against) evil." (10:6)

«خذوا ما آتیناکم بقوّة واذکروا ما فیه لعلکم تتقون» (البقره/٦٣)

"Take hold of the law We have given you with firmness and bear in mind what is in it, so that you may guard (against) evil" (2:63)

On the Learned:

«ومن آیاته خلق السموات والارض واختلاف السنتکم والوانکم، انّ فی ذلك لآیات للعالمین» (الروم/٢٢)

"And one of His signs is the creation of the heavens and the earth and the diversity of your thanks and colours; most surely there are signs in this for the learned." (30:22)

«هو الذی جعل الشمس ضیاء والقمر نوراً وقدّره منازل لتعلموا عدد السنین والحساب. ما خلق الله ذلك الاّ بالحق، یفصّل الآیات لقوم یعلمون» (یونس/٥)

"He it is who made, the sun a shining brightness and the moon a light, and ordained for it mansions that you might know the computation of years and the reckoning. Allah did not create it but in truth; He makes the signs manifest for a people who know." (10:5)

On the Mindful:

«ماذرأ لكم فى الارض مختلفاً الوانه، ان فى ذلك لآية لقوم يذكرون» (النحل/١٣)

"And what he has created in the earth of varied hues; most surely there is a sign in this for a people who are mindful." *(16:13)*

«ومن كل شيء خلقنا زوجين لعلكم تذكرون» (الذاريات/٤٩)

"And of everything We have created pairs that you may be mindful." (51:49)

On those who listen to truth God's word:

«ومن آياته منامكم بالليل والنهار وابتغاؤكم من فضله، انّ فى ذلك لآيات لقوم يسمعون» (الروم/٢٣)

"And one of His signs is your sleeping and your seeking of His grace by night and (by) day; most surely there are signs in this for a people who would hear." (30:23)

«والله انزل من السماء ماءً فاحيا به الارض بعد موتها، انّ فى ذلك لآية لقوم يسمعون» (النحل/٦٥)

"And Allah has sent down water from the cloud and therewith given life to the earth after its death; most surely there is a sign in this for a people who would listen." (16:65)

On the people who are sure:

فیچر فی گیٹ لائبریری
(شعبہ کتب)
بیت الحکمت - سائنس سنٹر
مولانا آزاد روڈ - کراچی

«وفی خلقکم وما یبث من دابة آیات لقوم یوقنون» (الجاثیه/٤)

"And in your (own) creation and in what He spreads abroad of animals there are signs for a people that are sure." (45:4))

«وفی الارض آیات للموقنین وفی انفسکم افلا تبصرون» (الذاریات/٢٠ــ٢١)

"And in the earth there are signs for those who are sure; And in your own souls (too): will you not then see? (51:20-21)

On those who examine truth, have insight, and understand:

«وهو الذی أنشأکم من نفس واحدة فستقر ومستودع. قد فصلنا الآیات لقوم یفقهون» (الأنعام/٩٨)

"And He it is who has brought you into being from a single soul, then there is (for you) a resting place and a depository; indeed We have made plain the communications for a people who understand." (6:98)

«فاخذتهم الصیحة مشرقین. فجعلنا عالیها سافلها، وامطرنا علیهم حجارة من سجیل، انّ فی ذلك لآیات للمتوسمین» (الحجر/٧٣ــ٧٥)

"So the rumbling overtook them (while) entering upon the time of sunrise. Thus did we turn it upside down, and rained down upon them stones of what has been decreed. Surely in this are signs for those who examine." (15:73-75)

«کلوا وارعوا أنعامکم. انّ فی ذلك لآیات لاولی النهی» (طه/٥٤)

"Eat and pasture your cattle; most surely there are signs in this for those endowed with understanding." (20:54)

What we understand from the words: "Tafakkur Taaqqul, Tafaqquh, etc." used in the Quran is that they refer to different degrees of intellectual perception and some are indispensible for some others. For example, by comparing the following verses:

«ان في خلق السمٰوات والارض واختلاف الليل والنهار لآيات لاولي الالباب، الذين يذكرون الله قياما وقعودا وعلى جنوبهم ويتفكرون في خلق السموات والارض ربنا ما خلقت هذا باطلا...» (آل عمران/١٩٠–١٩١)

"Most surely in the creation of the heavens and the earth and the alternation of the right and the day there are signs for men who understand. Those who remember Allah standing and sitting and being on their sides and reflect on the creation of the heavens and the earth: Our Lord! 'Thou hast not created this in vain. Glory be to thee; save us then from the chastisement of the fire!" (3:190-191)

«انّ في خلق السموات والارض واختلاف الليل والنهار... لآيات لقوم يعقلون» (البقرة/١٦٤)

"Most surely in the creation of the heavens and the earth and the alternation of the night and the day... there are signs for a people who understand." (2:164)

«انّ في اختلاف الليل والنهار وما خلق الله في السموات والارض لآيات لقوم يتقّون» (يونس/٦)

"Most surely in the alternation of the night and the day, and what Allah has created in the heavens and the earth, there are signs for a people who guard (against evil)." (10:6)

«... وتزودوافان خير الزاد التقوى، واتقون يا اولى الالباب» (البقرة/١٩٧)

"...and make provision, for surely the provision is the guarding of oneself, and be careful (of your duty) to Me, O men of understanding." (2:197)

«وتلك الامثال نضربها للناس وما يعقلها الاّ العالمون» (العنكبوت/٤٣)

"And (as for) these examples, We set them forth for the people and none understand them but the learned." (29:43)

It may be concluded that **"Ulal- Albäb"** possess "reasoning faculty", meditation, piety and knowledge. Their other characteristics are: listening and hearing the right word, ability of avoiding fallacies of illusions, worshipping God, having wisdom, being mindful and taking an example of the past experiences (of ancestors). These characteristics are deducible from the following verses:

«... فبشر عباد الذين يستمعون القول فيتبعون احسنه، اولئك الذين هديهم الله واولئك هم اولوا الالباب» (الزمر/١٧ــ١٨)

"Those who listen to the word, then follow the best of it, those are they whom Allah has guided, and those it is who are the men of understanding." (39:18)

«هو الذى انزل عليك الكتاب، منه آيات محكمات هن أمُّ الكتاب واخر متشابهات فاما الذين فى قلوبهم زيغ فيتّبعون ما تشابه منه ابتغاء تأويله ومايعلم تأويله الاّ الله والراسخون فى العلم، يقولون آمنا به كل من عند ربنا وما يذكر الاّ اولوا الالباب» (آل عمران/٧)

"He it is who has revealed the book to you; some of its verses are decisive, they are the basis of the Book, and others are allegorical; then as for those in whose hearts there is perversity, they follow the part of it which is all allegorical, seeking to mislead, and seeking to give it (their own) interpretation, but none knows its interpretation except Allah, and those who are firmly rooted in knowledge say: We believe in it, it is all from our Lord; and none do mind except those having

understanding." (3:7)

«أمّن هو قانت آناء الليل ساجداً وقائماً يحذر الآخرة و يرجو رحمة ربّه، قل هل يستوى الذين يعلمون والذين لايعلمون، انّما يتذكّر اولوا الالباب» (الزمر/٩)

"What! He who is obedient during hours of the night prostrating himself and standing, takes care of the hereafter and hopes for the mercy of his Lord! Say: Are those who know and those who do not know alike? Only the men of understanding are mindful." (39:9)

يؤتى الحكمة من يشاء ومن يؤت الحكمة فقداوتى خيراً كثيراء وما يذكّر الاّ اولوا الالباب» (البقرة/٢٦٩)

"He grants wisdom to whom He pleases, and whoever is granted wisdom, he indeed is given a great good, and none but men of understanding mind." (2:269)

«الم تر ان الله انزل من السماء ماءً فسلكه ينابيع فى الارض، ثم يخرج به زرعاً مختلفاً الوانه، ثم يهيج فتريه مصفراً، ثم يجعله حطاماً، انّ فى ذلك لذكرى لاولى الالباب» (الزمر/٢١)

"Do you not see that Allah sends down water from the cloud, then makes it go along in the earth in springs, then brings forth therewith herbage of various colours, then it withers so that you see it becoming yellow, then He makes it a thing crushed and broken into pieces? Most surely there is a reminder in this for the men of understanding." (39:21)

«لقد كان فى قصصهم عبرة لاولى الالباب...» (يوسف/١١١)

"In their histories there is certainly a lesson for men of understanding." (12:111)

One can see that "Ulal-Albab" possess most of the characteristics mentioned in the Quran for understanding nature. They have purified intellects, and, therefore, have better capability for attaining a deeper knowledge of nature.

Also from the comparison of the following verses:

«وهو الذی جعل لکم النجوم لتهتدوا بها فی ظلمات البر والبحر، قد فصلنا الآیات لقوم یعلمون» (الانعام/۹۷)

"And He it is who has made the stars for you that you might follow the right way thereby in the darkness of the land and the sea; truely we have made plain the communications for a people who know." (6:97)

«وهو الذی أنشأکم من نفس واحدة فمستقر ومستودع، قد فصلنا الآیات لقوم یفقهون» (الانعام/۹۸)

"And He it is who has brought you into being from a single soul, then there is (for you) a resting-place and a depository; indeed we have made plain the communications for a people who understand." (6:98)

«وهو الذی انزل من السماء ماء فاخرجنا به نبات کل شیء فاخرجنا منه خضرا نخرج منه حبا متراکباً ومن النخل من طلعها قنوان دانیة وجنات من اعناب والزیتون والرمان مشتبها وغیر متشابه، انظروا الی ثمره اذا اثمر وینعه، انّ فی ذلکم لآیات لقوم یؤمنون» (الانعام/۹۹)

"And He it is who sends down water from the cloud, then We bring forth with it buds of all (plants), then we bring forth from it green (foliage) from which we produce grain filled up (in the ear); and of the palm- tree, of the sheaths of it, come forth clusters (of dates) within reach, ... most surely there are signs in this for a people who believe."

We realise (as 'Allamah Tabätabäï has mentioned[30])

that while understanding certain things related to plants is possible for unlearned believers, the understanding of astronomical problems requires scientific background, and the understanding of issues related to the human soul and its mysteries needs theoretical knowledge as well as profound understanding of human nature. The Quran refers to a sublime faculty of cognition which is the cognition of the 'spiritual dimension' (Malakūt) of the heavens and the earth:

«وكذلك نرى ابراهيم ملكوت السموات والارض وليكون من الموقنين» (الانعام/٧٥)

"And thus did We show Ibrāhīm the spiritual dimension of the heavens and the earth, and that he might be of those who are sure." (6:75)

«اولم ينظروا فى ملكوت السموات والارض وما خلق الله من شيء...» (الاعراف/١٨٥)

"Do they not consider the spiritual dimension of the heavens and the earth and whatever things Allah has created?" (7:185)

Moreover, the first verse indicates that the vision of 'spiritual dimension' results in sureness. There have been various interpretations of '**Malakūt**'. Some scholars, including 'Allāmah Tabātabā'i,[31] believe it to be the innermost aspect of beings and the deepest attachment of their very existence to the Almighty God. Some meant by it wonders in the heavens and the earth,[32] and some others interpret it as the laws of nature.[33]

.In reference to the vision of '**Malakut**', various views have been expressed. Majority of the interpreters believe it to be a non-sensual vision or an intellectual one.[34] Imām Fakhr al-Din Razi in his interpretation of the first verse (i.e. 6:75) says:[35]

"There are two views in connection with the "revealing": First statement indicates that God revealed the spiritual dimension to Ibrāhim's ordinary eyes... and the second indicates that it was his inner and mental discernment that had this vision, not his physical eyes. These things prove that the vision had been through mental discernment not through the eyes."

It is quite certainly a profound cognition of nature; and as it ends in certitude and sureness, therefore, it is the highest level of cognition. And to attain this kind of cognition, one requires all the qualifications mentioned in the verses quoted in this section.

Thus, we conclude

1- There are different levels of understanding a phenomenon.

2- For understanding the different natural phenomena, there are different pre-requisite conditions.

3- To have a more profound understanding of nature, researchers should try to acquire the above- mentioned characteristics more and more. These characteristics can be briefly summarised in the following three categories: scientific aptitude, higher (analytical) intellect, and faith with piety.

One may question the role of faith and piety in the proper understanding of nature; or can say for what reason has God denied the proper cognition to unbelievers in the following verses:

«قل انظروا ماذا فی السمٰوات والارض وما تغنی الایات والنذرعن قوم لایؤمنون» (یونس/۱۰۱)

"Say: consider what is it that is in the heavens and the earth; and signs and warners do not avail a people who would not believe." (10:101)

اولم یروا الی الارض کم انبتنا فیها من کل زوج کریم. انّ فی ذلك لآیة وما کان اکثرهم مؤمنین»

(الشعراء/۷-۸)

"Do they not see the earth, how many of every noble kind We have caused to grow in it? Most surely there is a sign in that, but most of them will not believe." (26:7-8)

«وما انت بهادالعمی عن ضلالتهم، ان تسمع الا من یؤمن بآیاتنا فهم مسلمون» (الروم/٥٣)

"Nor can you lead away the blind out of their way. You cannot make to hear any but those who believe in our communications..." (30:53)

Why has God attributed the understanding of some of his signs in nature to the believers and the pious only?

«انّ فی السموات والارض لآیات للمؤمنین» (الجاثیة/٣)

"Most surely in the heavens and the earth there are some signs for the believers." (45:3)

«انّ فی اختلاف اللیل والنهار وما خلق الله فی السموات والارض لآیات لقوم یتقون» (یونس/٦)

"Most surely in the alternation of the night and the day, and what Allah has created in the heavens and the earth, there are signs for a people who guard (against) evil." (10:6)

Is it not true that every person whether believer or non-believer may be capable of logical thinking? Isn't the Quran Itself logically arguing with unbelievers and polytheists. To answer this question we seek help from the Quran itself. In view of the inseparability of piety and faith:

«... واتقوا الله ان کنتم مؤمنین» (المائدة/٥٧)

"And be careful of (your duty to) God if you are believers." (5:57)

«ان تتقوا الله یجعل لکم فرقانا...» (الانفال/٢٩)

One can point out that as the effect of faith man can differentiate between right and wrong, for his intellectual activity is free from the vices caused by devilish inducements and temptations.

As Mowlavi puts it:

آینه دل چون شود صافی و پاک — نقشها بینی برون از آب و خاک
هم به بینی نقش و هم نقاش را — فرش دولت را وهم فرّاش را

When the mirror of heart gets clean and stainless,
Therein you see images beyond earth and water,
You see both the Painter and the paintings,
Both the Divine carpet and the carpet spreader.

Or as Hafez puts it:

چشم آلوده نظر از رخ جانان دوراست — بر رخ او نظر از آینهٔ پاک انداز
غسل در اشک زدم کاهل طریقت گویند — پاک شود اوّل و پس دیده بر آن پاک انداز

The blurred eye cannot reach the face of the beloved,
Cast your look upon her when your mirror is clean,
I rinsed my eyes clean with my own tears, as the visionaries say,
First clean yourself and then look upon the clean.

In his exegesis of the Quran "al-Mizan", "Allämah Tabätabä'i says:[36] "The reason why the Holy Quran emphasizes piety alongside reflection, intellection and remembrance, and has related knowledge with practice is that it ensures the stability of thought, righteousness of knowledge and avoidance of vices of caprice and evil."

A saying from our great Phophet (S) has been reported, which confirms it:[37]

«لولا ان الشياطين يحومون على قلوب بنى آدم لنظروا الى ملكوت السماء»

"Had the party of devil not moved around the minds of the children of Adam, they would have seen the spiritual dimension of the sky."

There is also a statement from Imäm 'Alī (AS) on the same line:[18]

«ومن لم يهذب نفسه لم ينتفع بالعقل»

"One who does not render his heart clean does not benefit from his intellect."

Therefore, the important role of piety and cleanness of heart (sanctification) is to harness the slips of intellect. However, we deduct from certain Quranic verses and Islamic works that the effect of piety is not limited to the repulsion of the impediments of cognition; but through piety and sanctification one can attain cognition above and beyond the cognition attained through experience and reasoning. In this connection, we are going to cite some relevant verses from the Quran:

«... واتقوا الله و يعلّمكم الله...» (البقرة/٢٨٢)

"... and be careful of (your duty to) Allah. Allah teaches you, and Allah knows all things." (2:282)

«والذين جاهدوا فينا لنهدينهم سبلنا...» (العنكبوت/٦٩)

"And (as for) those who strive hard for Us, We will most certainly guide them in Our ways; and Allah is most surely with the doers of good." (29:69)

«وكذلك نرى ابراهيم ملكوت السموات والارض وليكون من الموقنين» (الانعام/٧٥)

"And thus did We show Ibrahim the spiritual dimension (Malakut) of the heavens and the earth and that he might be of those who are sure." (6:75)

A Tradition of the Prophet (S), which is universally accepted and respected by all Muslims, says:[39]

«قال رسول الله(ص): قال الله عزوجل... وما تقرب الى عبد بشيء احب الى مما افترضت عليه وانه ليتقرب الي بالنافلة حتى احبه فاذا احببته كنت سمعه الذي يسمع به وبصره الذي يبصر به ولسانه الذي ينطق به ويده التي يبطش بها، ان دعاني اجبته وان سألني اعطيته»[٣٩]

"No servant has sought My proximity through what is more favourite to Me than performing his duties; but through praiseworthy acts a servant gets so close to Me that I love him. It is then that I become an ear for him by means of which he hears, an eye for him by means of which he sees, a tongue for him by means of which he speaks and a hand with which he grasps. Should he call Me, I respond to him; and should he request something, I bestow upon him."

It has also been reported that our great Prophet (S) had said:[40]

«ما اخلص عبد لله عزوجل اربعين صباحا الا جرت ينابيع الحكمة من قلبه على لسانه»

"No servant devotes his full forty mornings to (the service of) God except when the springs of wisdom flow from his heart to his tongue."

And it is reported from Imäm 'Ali (AS) in **Nahj-al-Balāghah**:[41]

قد احيا عقله وامات نفسه حتى دق جليله ولطف غليظه وبرق له لامع كثير البرق فابان له الطريق وسلك به السبيل، وتدافعته الابواب الى باب السلامة ودارالاقامة وثبتت رجلاه بطمانينة بدنه في قرار الامن والراحة، بما استعمل قلبه، وارضى ربه»

"He(the believer) kept his mind alive and killed (the desires of) his heart till his body became thin, his bulk turned light and effulgence of extreme brightness shone for him. It lighted the way for him and took him on the (right) path. Different doors led him to the door of safety and the place of (his permanent) stay. His feet, balancing his body, got fixed in the position of safety and comfort because he kept his heart busy (in good acts) and pleased his Allah."
Also in **Nahj-al-Balāghah** we find:[42]

«هجم بهم العلم على حقيقة البصيرة وباشروا روح اليقين واستلانوا ما استوعره المترفون وانسوا بما استوحش منه الجاهلون»

"Knowledge has led them to real understanding and so they have associated themselves with the spirit of conviction. They take easy what the easy- going regard as hard. They love what the ignorant took as strong."

In any case, it is certain that illumination and inspiration, as a source of knowledge is not open to all, and only those with proper background can benfit from it. The channel which is open to all is the employment of sensory experience and intellect; and, of course, in order to arrive at truth one should avoid the impediments in the way of cognition.

Impediments of Cognition

Sometime, certain internal factors overrule the intellect, and prevent it from functioning properly. Then, while the judgements are said to have been made wisely, in fact they are the product of an unhealthy intellect polluted with impurities. As Allameh Tabatabai puts it:[43] "The role of intellect in such cases resembles that of a judge who passes an unjust verdict relying on (forged) documents or false witnesses, though he may not have intended to do so." Therefore, a researcher should shake his mind of unfounded prejudgements and suppositions, and cleanse it of immoralities in order to attain a correct understanding. Gazzali in his "**Ihya 'al-Ulüm al-Dïn**" uses an interesting simile,[44] which, in some respects casts light on this subject. He says the human heart resembles a mirror which reflects good, clear pictures when it is shined and polished. The human heart, too, gets more sheen through noble qualities and better reflects the truth and realities; but when it is affected by vicious qualities, like a dust- covered mirror, it cannot depict realities. For the same reason, "not hearing" has connection with "the sealing of the heart" on account of

faulty deeds as shown in the following verses of the Holy Quran:

«... لونشاء أصبناهم بذنوبهم ونطبع على قلوبهم فهم لايسمعون»

(الاعراف/١٠٠)

"If We please, We would afflict them on account of their faults, and set a seal on their hearts so they would not hear."

(7:100)

«واتقوا الله واسمعوا...» (المائدة/١٠٨)

"...And be careful of (your duty to) God and hear..."

(5:108)

Thus, listening to, and hearing the right word is connected with piety; and not hearing it, or sealing the heart, is connected with committing sins.

Gazzali goes on with his simile and says:

For everything known there is a truth, a picture of which falls on the mirror of heart, which is the home of knowledge.

Now, in the same way that an ordinary mirror cannot reflect an image because of any one of the following defects:

1- imperfect components

2- opacity of the face of the mirror

3- not facing the bright side of the mirror

4- the existence of a barrier between the mirror and the object

5- the object not being placed in front of the mirror.

A human heart, which is capable of cognizing realities, may lose that capacity if affected by one of the following five causes:

1- intrinsic deficiency, as in the case of children

2- obscurity (darkness) caused by sins and lust.

Therefore, turning one's face towards the Creator, and turning away from passions purifies the heart and makes it glitter:

«والذين جاهدوا فينا لنهدينهم سبلنا...»

(العنكبوت/٦٩)

"Those who strive hard for us we will most certainly guide them in our ways..." (29:99)

3- Not paying attention to realities.

A heart may be clean, but if it does not search for truth, it is not revealed to him. For instance, a man whose sole endeavour is physical worship or earning his livelihood, without any meditation on the Divine realities hidden from common man's eyes, may get only what he is after, not more.

4- The existence of obstacles in the way of cognizing realities, i.e. veils and barriers between the heart and the object in view, due to which truth does not reveal itself. Blind imitation of the ancestors and the sedimented opinions of his own are hindrances to the perception of realities.

5- Ignorance of the method of attaining the object in view. A man in search of knowledge cannot succeed to do so unless he is provided with the prerequisites for attaining the desired reality. Therefore, ignorance of these prerequisites and their manner of combination is an impediment in the way of attaining knowledge. For instance a man who wants to see the back of his head, but holds the mirror in front of him, cannot see what he wants; if he holds the mirror behind his head, he cannot see even the mirror, much less his back. Thus he needs two mirrors to achieve his purpose, and the two mirrors should be set in a special position in relation to each other. It is the case with cognitions, too. For every cognition, its prerequisites should be attained first. Ignorance creates the impediments between the heart and realities. Otherwise, the heart is intrinsically noble and capable of attaining realities (this is a brief summary of Ghàzzali's views on the matter).

Now we are going to cite from the Holy Quran the factors which prevent a correct cognition. These factors can be classified under two or three general headings, but for the

sake of clarity of the matter, we use the very headings mentioned in the verses of the Quran.

1- Lack of faith

There are many verses in the Quran which indicate faithlessness as a great impediment in the way of cognition:

«ذلك بانّهم آمنوا ثم كفروا فطبع الله على قلوبهم فهم لايفقهون» (المنافقون/٣)

"That is because they believe, then disbelieve, so a seal is set upon their hearts so that they do not understand." (63:3)

«وما انت بهاد العمى عن ضلالتهم. ان تسمع الاّ من يؤمن بآياتنا فهم مسلمون» (الروم/٥٣)

"Nor can you lead away the blind out of their error. You cannot make to hear any but those who believe in Our communications so they shall submit." (30:53)

«... كذلك يجعل الله الرجس على الّذين لايؤمنون» (الانعام/١٢٥)

"... Thus does God lay uncleanness on those who do not believe." (6:125)

«... انّا جعلنا الشياطين اولياء الّذين لايؤمنون» (الاعراف/٢٧)

"Surely we have made the Shaitans to be guardians of those who do not believe." (7:27)

«انّ الذين لايؤمنون بآيات الله لايهديهم الله...» (النحل/١٠٤)

"(As for) those who do not believe in God's

communications, surely God will not guide them." (16:104)

«... والذين لايؤمنون في آذانهم وقر وهو عليهم عمىً...» (فصلت/٤٤)

"...and (as for) those who do not believe, there is a heaviness in their ears and it is obscure to them." (41:44)

Some verses in the Quran indicate that the sole reliance on knowledge, without faith, can never take one to the correct understanding of nature:

«قل انظروا ماذا في السمٰوات والارض وما تغني الآيات والنذر عن قوم لايؤمنون» (يونس/١٠١)

"Say: consider what is it that is in the heavens and the earth; and signs and warners do not avail a people who would not believe." (10:101)

«فاعرض عن من تولّى عن ذكرنا ولم يردالاّ الحيٰوة الدنيا، ذلك مبلغهم من العلم. انّ ربكّ هواعلم بمن ضلّ عن سبيله وهواعلم بمن اهتدىٰ (النجم/٢٩ـ٣٠)

"Therefore, turn aside form him who turns his back upon Our reminder and does not desire anything but this world's life. That is their goal of knowledge; and He knows best him who follows the right direction." (53:29-30)

As previously mentioned, the principal role of faith in understanding is to restore man's faculty of intellect to its original state.

2- The existence of the factors causing intellect's deviation:

The existence of certain characteristics and qualities in some people prevents them from exercizing sound judgement in discovering the truth. Here are some important ones:

a- Following one's desires, fancy and wishes.

It is repeatedly mentioned in the Quran that following one's desire and wishes leads one astray:

«فان لم يستجيبوا لك فاعلم انما يتبعون اهوائهم ومن اضل ممن اتبع هويه بغير هدى من الله...»

(القصص/٥٠)

"But if they do not answer you, know that they only follow their low desires: and who is more erring than he who follows his low desires without any guidance from God:" (28:50)

«افرأيت من اتخذ الهه هويه واضله الله على علم وختم على سمعه وقلبه وجعل على بصره غشاوة فمن يهديه من بعد الله افلا تذكرون» (الجاثية/٢٣)

"Have you then considered him who takes his low desire for his God, and Allah has made him err, having knowledge, and has set a seal upon his ear and his heart and put a covering upon his eye. Who can then guide him after Allah? Will you not then be mindful?" (45:23)

«... ولئن اتبعت أهواءهم بعدالذى جاءك من العلم مالك من الله من ولى ولانصير» (البقرة/١٢٠)

"And if you follow their desires after the knowledge that has come to you, you shall have no guardian from Allah, nor any helper." (2:120)

«...فاحكم بين الناس بالحق ولا تتبع الهوى فيضلك عن سبيل الله...»

(ص/٢٦)

"...so judge between men with justice, and do not follow desire, lest it should lead you astray from the path of God." (38:26)

«... وانّ كثيراً ليضلّون باهوائهم بغير علم...» (الانعام/١١٩)

"...and most surely many would lead (people) astray by their low desires out of ignorance..." (6:119)

أولئك الذين طبع على قلوبهم واتبعوا أهواءهم» (محمد/١٦)

"And these are they upon whose hearts God has set a seal and they follow their low desires." (47:16)

Our great prophet (S) has been quoted as saying:[45]

«ان اخوف ما اخـاف على امتى اهوى وطول الامل، امّا الهوى فانّه يصدعن الحق. واما طول الامل فينسى الآخرة».

"In your case I would fear of two characteristics obedience to desires and indulgence. Obedience to desires and fancies keeps you away from finding truth, and indulgence causes you to forget the Ressurrection."

And it has been reported from Imam Ali (AS) as saying:

«الهوى عدوالعقل»

"Desire is the enemy of reason."[46]

And «الامانى تعمى اعين البصائر»

"Ambition blinds man's insight."[47]

b- Blind love or hatred and unjustifiable prejudice.

These, too, are the factors which prevent the intellect from impartiality and seeking truth. An Arab poet said:

وعين الرضا عن كل عيب كليلة ولكن عين السخط تبدى المساويا

"A look through satisfied eyes covers all the faults, but a look of discontent uncovers all the faults."

Or as Mowlavi puts it:

چون غرض آمد هنر پوشیده شد صد حجاب از دل بسوی دیده شد

"When bias comes, art is covered
A hundred veils move from heart to (cover) the eyes."

The Holy Quran has repeatedly warned man against the diseases which inflict the heart:

«وأما ثمود فهديناهم فاستحبوا العمى على الهدى. فاخذتهم صاعقة العذاب الهون بما كانوا يكسبون»

فصلت/١٧)

"And as to Thamüd, we showed them the right way, but they chose error above guidance, so there overtook them the scourge of an abasing chastisement for what they earned."

(41:17)

«وعاداً وثمود وقد تبيّن لكم من مساكنهم وزيّن لهم الشيطان اعمالهم، فصدهم عن السبيل وكانوا مستبصرين» (العنكبوت/٣٨)

"And (we destroyed) Äd and Thamüd and from their dwellings (this) is apparent to you indeed; and the Shaytän made their deeds fair seeming to them, so he kept them back from their path, though they were endowed with intelligence and skill." (29:38)

«... وقال يا قوم لقد ابلغتكم رسالة ربي ونصحت لكم ولكن لاتحبون الناصحين» (الاعراف/٧٩)

"Then said: O my people I did certainly deliver to you the message of my Lord, and I gave you good advice, but you do not love those who give good advice." (7:79)

ذلك بانّهم استحبوا الحيوة الدنيا على الآخرة وانّ الله لايهدى القوم الكافرين. اولئك الذين طبع الله على قلوبهم و سمعهم وابصارهم واولئك هم الغافلون» (النحل/١٠٧ــ١٠٨)

"This is because they have this world's life more than the hereafter, and because Allah does not guide the unbelieving people. These are they on whose hearts and their hearing and their eyes Allah has set a seal, and these are the heedless ones." (16:107-108)

«لقد جئناكم بالحق ولكن اكثركم للحق كارهون» (الزخرف/٧٨)

"Certainly we have brought you the truth but most of you are adverse to the truth." (43:78)

«ذلك بانهم كرهوا ما انزل الله فاحبط اعمالهم» (محمد/٩)

"That is because they hated what God revealed. So He rendered their deed null." (47:9)

«... وزين ذلك في قلوبكم وظننتم ظنّ السوء وكنتم قوماً بوراً» (الفتح/١٢)

"...and that was made fairseeming to your hearts and you thought an evil thought and you were a people doomed to perish." (48:12)

وقال نسوة في المدينة امرأة العزيز تراود فتاها عن نفسه، قد شغفها حبّا. انّا لنراها في ضلال مبين» (يوسف/٣٠)

"And women in the city said: "The chief's wife seeks her slave to yield himself (to her). surely he has affected her deeply with (his) love, most surely we see her in manifest error." *(12:30)*

«وكذلک زيّن لفرعون سوء عمله وصدّ عن السبيل...» (غافر/٣٧)

"And thus the evil of his deed was made fairseeming to Pharaoh, and he was turned away from the way..." (40:37)

It has been quoted from the great Prophet(S):[48]

«حبّك للشيء يعمي و يصم»

"Loving something makes you blind and deaf (in relation to it)."

And it has been quoted from 'Ali (AS):

«ومن عشق شيئاً اعشى بصره وامرض قلبه فهو ينظر بعين غيرصحيحة و يسمع باذن غير سميعة»

"A lover is blind and sick at heart, so he faces the truth with unhealthy sight and a deaf ear."[49]

and: «انّ القلب اذا كره عمى»

'Heart turns blind to what it dislikes."[50]

C- Pomposity:

It happens so often that a person (though aware of the fact) does not accept the truth. The Quran warns this group of people of God's severe punishment:

«يسمع آيات الله تتلى عليه ثم يصر مستكبراً كان لم يسمعها فبشّره بعذاب اليم. واذا علم من آياتنا شيئاً اتخذها هزواً. أولئك لهم عذاب مهين» (الجاثية/٨ــ٩)

"Who hears the communications of Allah recited to him, then persists proudly as though he has not heard them! So announce to him a painful punishment. And when he comes to know of any of Our communications, he takes it for a jest; these it is that shall have abasing chastisement." (45:8-9)

«انّ الذين يجادلون فى آيات الله بغير سلطان آتاهم، ان فى صدورهم الاّ كبر ماهم ببالغيه، فاستعذ بالله...» (غافر/٥٦)

"Surely (as for) those who dispute about the communications of God without any authority that has come to them, there is naught in their breasts but (a desire) to become great which they shall never attain to..." (40:56)

«فلمّا جاءتهم آياتنا مبصرة قالوا هذا سحر مبين، وجحدوا بها واستيقنتها انفسهم ظلماً وعلواً، فانظر كيف كان عاقبة المفسدين» (النمل/١٣ــ١٤)

"So when Our clear signs came to them, they said: this is clear enchantment, and they denied them unjustly and proudly while their soul had been convinced of them; consider, then how was the end of the mischief- makers." (27:13-14)

«... فما اغنى عنهم سمعهم ولاابصارهم ولاافئدتهم من شيء اذ كانوا يجحدون بآيات الله وحاق بهم ما كانوا به يستهزؤن» (الاحقاف/٢٦)

"But neither their ears nor their eyes, nor their hearts availed them aught since they denied the communications of

God, and that which they mocked encompassed them." (46:26)

«انّ الذين كذّبوا بآياتنا واستكبروا عنها لا تفتح لهم ابواب السماء...» (الاعراف/٤٠)

"Surely (as for) those who reject Our communications and turn away from them haughtily, the doors of heaven shall not be opened for them." (7:40)

«وانّى كلّما دعوتهم لتغفرلهم جعلوا اصابعهم فى آذانهم واستغشوا ثيابهم واصرّوا واستكبروا استكباراً» (نوح/٧)

"And whenever I have called them that Thou mayest forgive them, they put their fingers in their ears, cover themselves with their garments, and persist and are puffed up with pride." (71:7)

«ثم أدبرواستكبر. فقال ان هذا الا سحر يؤثر» (المدثر/٢٣ـ٢٤)

"Then he turned back and was big with pride. Then he said: This is naught but enchantment narrated." (74:23-24)

It is quoted from our Prophet (S) who said:[51]

«ياعلى ثلاث درجات وثلاث كفارات وثلاث منجيات... واما المهلكات فشح مطاع وهوى متبع واعجاب المرء بنفسه».

"O, 'Ali, people perish because of three characteristics: jealousy, (carnal) desire, and egoism."

And it has been reported from 'Ali (AS) who said:[52]

«العجب يفسد العقل»

"Egoism corrupts intellect."

d- Blind imitation of the ancestors' opinions, men of authority, and the sediments of one's own thoughts.
These, too, are characteristics which put barriers in the way of seeking the truth, and are repeatedly condemned in the Quran:

«وقالوا ربنا انا اطعنا سادتنا وكبراءنا فاضلونا السبيلاً (الاحزاب/٦٧)

"And they shall say: O our Lord. Surely we obeyed our leaders and our great men, so they led us astray from the path." (33:67)

«بل نتبع ما الفينا عليه آباءنا او لوكان آباؤهم لايعقلون شيئاً ولا يهتدون» (البقرة/١٧٠)

"Nay, we follow what we found our fathers upon. What, and though their fathers had no sense at all, nor did they follow the right way." (2:170)

«فلما جاءتهم رسلهم بالبينات فرحوا بما عندهم من العلم وحاق بهم ما كانوا به يستهزءون» (المؤمن/غافر/٨٣)

"Then when their apostles came to them with clear arguments, they exulted in what they had with them of knowledge, and there beset them that which they used to mock." (40:83)

«واذا قيل لهم تعالوا الى ما انزل الله والى الرسول قالوا حسبنا ما وجدنا عليه آباءنا او لو كان آباؤهم

لايعلمون شيئاً ولايهتدون» (المائده/١٠٤)

"And when it is said to them: Follow what Allah has revealed and this messenger, they say: 'Nay! We follow what we find our fathers upon. What! and though their fathers had no sense at all, nor did they follow the right way." (5:104)

«وكذلك ما ارسلنا من قبلك في قرية من نذير الاقال مترفوها انا وجدنا آباءنا على أمة وإنا على آثارهم مقتدون ● قال او لو جئتكم بأهدى مما وجدتم عليه آباءكم قالوا انا بما ارسلتم به كافرون» (الزخرف/٢٣ــ٢٤)

"And thus, we did not send before you any warner in a town, but those who had easy lives in it said: surely we find our fathers on a course, and surely we are followers of their footsteps. (The warner) said: 'What! even if I bring to you a better guide than that on which you find your fathers?' They said: 'surely we are unbelievers in that with which you are sent'." (43:23-34)

«وتلك عاد جحدوا بآيات ربهم وعصوا رسله واتبعوا امر كل جبّار عنيد» (هود/٥٩)

"And this was 'Äd: they denied the communications of their Lord, and disobeyed His apostles and followed the bidding of every insolent opposer (of truth)." (11:59)

«... فاتبعوا أمر فرعون وما أمر فرعون برشيد» (هود/٩٧)

"...but they followed the bidding of Pharaoh, and Pharaoh's bidding was not right- directing." (11:97)

e- Haste in judgements:

Haste often is the cause of carelessness and error in

understanding the truth. That is why the Quran has warned us against it:

«خلق الانسان من عجل سأُوريكم آياتي فلا تستعجلون» (الانبياء/٣٧)

"Man is created of haste; now will I show to you my signs, therefore, do not ask Me to hasten (them) on." (21:37)

«... ولا تعجل بالقرآن من قبل ان يقضىٰ اليك وحيه وقل ربّ زدني علماً» (طه/١١٤)

"...and do not make haste with the Quran before its revelation is made complete to you." (20-114)

«يا ايها الذين آمنوا ان جاءكم فاسق بنبأ فتبينوا ان تصيبوا قوماً بجهالة فتصبحوا على مافعلتم نادمين» (الحجرات/٦)

"O You who believe! if an evil-doer comes to you with a report, look carefully into it, lest you harm a people in ignorance, then be sorry for what you have done." (49:6)

It has been quoted from our Prophet (S) who said:[53]

«الأناة من الله، والعجلة من الشيطان»

"Haste is the deed of Shaytän, and tranquility is from Allah."

«انّما اهلك الناس العجلة، ولو ان الناس تثبتوا لم يهلك احد»

"Indeed human beings face death when they act hastily;

had men had stability they would not have been perished." And Imām 'Alī has been quoted as saying:[54]

«العجلة تمنع الاصابة»[55]

"Haste hinders one from reaching righteousness and rectitude."

3- Ignorance:

Most of the errors in judgements (whether scientific or non-scientific) originate from ignorance of the subject and lack of enough knowledge about it.

In the Quran, there are a good number of verses in which ignorance has been condemned:

«قال ربّ انی اعوذبك ان اسالك مالیس لی به علم...» (هود/٤٧)

He said: *"My Lord! I seek refuge in Thee from asking Thee that of which I have no knowledge." (11:47)*

«... فلم تحاجّون فیما لیس لکم به علم...» (آل عمران/٦٦)

..."why then do you dispute about that of which you have no knowledge?" (3:66)

«... وان کثیراً لیضلّون باهوائهم بغیر علم...» (الانعام/١١٩)

"And most surely many would lead (people) astray to their low desires out of ignorance..." (6:119)

«ومن الناس من یجادل فی الله بغیر علم ولاهدی ولا کتاب منیر» (الحج/٨)

"And among men there is he who disputes about Allah without knowledge and without guidance and without an illuminating book." (22:8)

«... وابلغكم ما ارسلت به ولكني اريكم قوماً تجهلون» (الاحقاف/٢٣)

"...and I deliver to you the message with which I am sent but I see you are a people who are ignorant." (46:23)

Our great Prophet (S) is reported as saying:[5]

«من افتى الناس بغير علم لعنته ملائكة السموات والارض»

"The angels in the heavens and the earth curse the person who passes judgement without knowledge."

Among the evident examples of ignorant judgements, one may include subjection to conjecture, unfounded confirmations or rejections, and superficial consideration of events and phenomena.

i- Subjection to Conjecture:

In the Quran we have been repeatedly warned against subjection to conjecture and sacrificing knowledge to supposition:

«و قالوا ماهي الا حياتنا الدنيا نموت ونحيا وما يهلكنا الا الدهر وما لهم بذلك من علم، ان هم الا يظنون» (الجاثية/٢٤)

"They say: There is nothing but our life in this world: we live and die and nothing destroys us but time, and they have no knowledge of that; they only conjecture." (45:24)

«وما لهم به من علم، ان يتبعون الا الظن، وان الظن لا يغني من الحق شيئاً» (النجم/٢٨)

And they have no knowledge of it; they do not follow anything but conjecture, and surely conjecture does not avail against the truth at all." (53:28)

«وما يتبع اكثرهم الاّ ظنّاً، انّ الظنّ لايغني من الحق شيئاً... (يونس/٣٦)

"And most of them do not follow (anything) but conjecture; surely conjecture will not avail against the truth."

«... يظنّون بالله غيرالحق ظنّ الجاهلية...» (آل عمران/١٥٤).

"They entertained about God, thoughts of ignorance quite unjustly." (3:154)

ii- Unfounded Confirmations and Rejections

The glorious Quran encourages us to follow reason and avoid unfounded confirmations:

«... قل هل عندكم من علم فتخرجوه لنا، ان تتبعون الاّ الظن وان انتم الاّ تخرصون» (الانعام/١٤٨)

"Say: Have you any knowledge with you so you should bring it forth to us? You only follow a conjecture and you only tell lies." (6:148)

«وقالوا لن يدخل الجنة الاّ من كان هوداً اونصارى تلك امانيهم، قل هاتوا برهانكم ان كنتم صادقين» (البقرة/١١١)

"And they said: None shall enter the garden (of paradise) except he who is a Jew or a Christian. These are their vai desires. Say: Bring your proof if you are truthful." (2:111)

«قل أرأيتم ما تدعون من دون الله، اروني ماذا خلقوا من الارض ام لهم شرك في السموات، ائتوني بكتاب من قبل هذا او أثارة من علم ان كنتم صادقين» (الاحقاف/٤)

"Say: Have you considered what you call upon besides Allah? show me what they have created of the earth, or have they a share in the heavens? Bring me a book before this or traces of knowledge, if you are truthful." (46:4)

«إن الذين يجادلون في آيات الله بغير سلطان آتيهم، ان في صدورهم الا كبر ماهم ببالغيه، فاستعذ بالله، انه هوالسميع البصير» (غافر/٥٦)

"Surely (as for) those who dispute about the communications of Allah without any authority that has come to them, there is naught in their breast but (a desire) to become great which they never attain to; Therefore, seek refuge in Allah, surely He is the hearing, the seeing." (40:56)

««ولا تقف مالیس لك به علم، ان السمع والبصر والفؤاد كل اولئك كان عنه مسؤلاً» (الاسراء/٣٦)

"And follow not that of which you have not the knowledge; Surely the hearing and the sight and the heart, all of this shall be questioned about that." (17:36)

It is important in any research neither to confirm nor refute (reject) any view without taking into consideration all the relevant information available and even then reserve judgement till one arrives at a certain result. It is quoted from Imam al-Sadiq as having said:[56]

«ان الله تبارك وتعالى خصّ عباده بآيتين من كتابه ان لايقولوا حتى يعلموا ولا يردوا مالم يعلموا. قال الله عزوجل: «الم يؤخذ عليهم ميثاق الكتاب ان لايقولوا على الله الا الحق...» (الأعراف/١٦٩)،

وقال: «بل كذبوا بما لم يحيطوا بعلمه ولما يأتهم تأويله...» (يونس/٣٩)

"Allah has earmarked two verses from His Book (Quran) for his creatures: not to speak on any subject until they know about it, nor reject what they do not know. Allah has said: 'Did they not pledge not to utter but the truth about God.' and Allah has said: 'They rejected what they did not know while they had not access to its interpretation'."

Unfortunately, overlooking this important principle has led some research scholars in natural sciences to some unfounded generalisations or rejections, thus causing irreparable material and spiritual loss to human societies. Atheism and materialism, predominant in certain academic circles, are striking examples of this wrong attitude. Those who base their judgements on perceptibles only have no right to deny supra- perceptible realities. The most they are entitled to do is to keep silent in such matters.

Researchers should always bear in mind the advice given by Ibn Sinä in his **al-Ishärät, waal- Tanbihät** which in fact, beautifully elaborates the spirit of the aforementioned Quranic verses. It goes as follows:[57]

"Lest you believe that rejecting is the sign of cleverness or disgusting vulgarity; because this is (a sign of) imbecility and weakness. Rejection of what is not clear to you is no less foolish than confirming what is not proved to you. Should you hear something which sounds odd to you, you should hang onto it unless you have a proof for its improbability. It is advisable that you consider such issues just probable as long as they have not been rejected by firm proofs..."

iii- Superficiality:

The Quran strongly condemns those who look at the natural phenomena superficially and pass comments without trying to find reasons behind the natural events:

«وقالوا لو كنا نسمع او نعقل ما كنا في اصحاب السعير» (الملك/١٠)

"And they shall say: Had we but listened or pondered, we should not have been among the inmates of the burning fire." (67:10)

«... ويجعل الرجس على الذين لايعقلون» (يونس/١٠٠)

"...and He casts uncleaness on those who will not understand." (10:100)

«واذا ناديتم الى الصلوة اتخذوها هزواً ولعباً، ذلك بأنهم قوم لايعقلون» (المائدة/٥٨)

"And when you call to prayer they make mockery and a joke; this is because they are a people who do not understand." (5:58)

«ومنهم من يستمعون اليك، افانت تسمع الصم ولوكانوا لايعقلون» (يونس/٤٢)

"And there are those of them who hear you, but can you make the deaf to hear though they will not understand?" (10:42)

«افلم يسيروا في الارض فتكون لهم قلوب يعقلون بها...» (الحج/٤٦)

"And have they not travelled in the land so that they should have hearts with which to understand, or ears with which to hear..." (22:46)

«يعلمون ظاهراً من الحيوة الدنيا وهم عن الآخرة هم غافلون» (الروم/٧)

"They know the outward of this world's life, but of the hereafter they are absolutely heedless." (30:7)

«وكأين من آية فى السموات والارض يمرّون عليها وهم عنها معرضون» (يوسف/١٠٥)

"And how many a sign in the heavens and the earth which they pass by, yet they turn aside from it." (12:105)

On the basis of the following two verses we can conclude that the fundamental difference between man and beasts of burden lies in rationality; therefore, a man not utilising his reason is even less conscious of the right way than animals:

«انّ شرالدواب عندالله الصمّ البكم الذين لايعقلون» (الانفال/٢٢)

"Surely the vilest of animals, in Allah's sight, are the deaf, the dumb, who do not understand." (8:22)

«أم تحسب ان أكثرهم يسمعون او يعقلون، ان هم الاّ كالانعام بل هم أضلُّ سبيلاً» (الفرقان/٤٤)

"Or do you think that most of them do hear or understand? they are nothing but as cattle; nay, they are astraying farther off from the path." (25:44)

Indifference towards Craving for or Acceptance of Truth:

One of the important factors that leads a researcher, in any field of research, to success is that the researcher should solely look for the truth. The glorious Quran calls on man to seek and follow the truth:

«... فبشّر عباد. الذين يستمعون القول فيتبعون احسنه. اولئك الذين هديهم الله واولئك هم اولوالالباب» (الزمر/١٧ــ١٨)

"Therefore, give good news to My servants who listen to

the word, then follow the best of it. These are whom Allah has guided and who are the men of understanding." (39:18)

«افمن يهدى الى الحق احق ان يتبع امن لايهدّي الا ان يهدى...» (يونس/٣٥)

"Is He then Who guides to the truth more worthy to be followed, or he who himself does not go aright unless he is guided?" (10:35)

«... لقد جاءك الحق من ربك فلا تكونن من الممترين.» (يونس/٩٤)

"...certainly the truth has come to you from your Lord, Therefore, you should not be of the disputers." (10:49)

«... فماذا بعد الحق الاّ الضلال فانّى تصرفون» (يونس/٣٢)

"...what is there after the truth but error; how are you then turned back?" (10:32)

Furthermore, the Quran condemns those who have no craving for truth or do not accept it when it is told to them:

«فقد كذّبوا بالحق لما جاءهم...» (الانعام/٥)

"So they have indeed rejected the truth when it came to them. (6:5)

«لقد جئناكم بالحق ولكن اكثركم للحق كارهون» (الزخرف/٧٨)

"Certainly we have brought you the truth, but most of you are adverse to the truth." (43:78)

«ومن اظلم ممن افترىٰ على الله كذبا اوكذّب بالحق لماجاءه...» (العنكبوت/٦٨)

"And who is more unjust than, one who forges a lie against Allah, or gives the lie to the truth when it has come to him." (29:68)

«سأصرف عن آياتي الذين يتكبرون في الارض بغير الحق، وان يروا كل آية لايؤمنوا بها، وان يروا سبيل الرشد لايتخذوه سبيلاً وان يروا سبيل الغي يتخذوه سبيلا، ذلك بانّهم كذبوا بآياتنا وكانوا عنها غافلين» (الاعراف/١٤٦)

"I will turn away from my communications those who are unjustly proud in the earth: and if they see every sign they will not believe in it: and if they see the way of rectitude they do not take it for a way, and if they see the way of error, they take it for a way. This is because they rejected our communications and were heedless of them." (7:148)

In the light of the glorious verses which follow, one comes to realise that Divine Verses are instructive for the people who eagerly listen to and think about what they hear, and finally accept what is right:

«ومن آياته منامكم بالليل والنهار وابتغاؤكم من فضله، ان في ذلك لآيات لقوم يسمعون» (الروم/٢٣)

"And one of His signs is your sleeping and your seeking of His grace by night and (by) day: most surely there are signs in this for people who would hear." (30:23)

«والله انزل من السماء ماءً فاحيا به الارض بعد موتها، ان في ذلك لآية لقوم يسمعون» (النحل/٦٥)

"And Allah has sent down water from the heaven (cloud) and therewith given life to the earth after its death: most surely

there is a sign in this for a people who would listen." (16:65)

Guiding Principles in Understanding Nature

We have already said that the Quran is not a book of natural science but a book of guidance and enlightenment, and wherever there is reference to the natural phenomena, it is meant to guide man through them. We also explained that God has gifted man with mental faculties so that through his own endeavours and God's help he can gradually come to understand the universe as well as his own self, and in that way to get nearer to the Creator of the universe.

According to the following glorious verses:

«... ونزلنا عليك الكتاب تبياناً لكل شيء وهدىً ورحمة وبشرى للمسلمين» (النحل/٨٩)

"...and we have revealed the book to you explaining clearly everything, and as a guidance and mercy and good news for those who submit." (16:89)

«... ما فرطنا في الكتاب من شيء...» (الانعام/٣٨)

"...we have not neglected anything in the Book..." (6:38)

The Quran undertakes the guidance of human beings in all stages of life. One, therefore, can expect to derive the guiding principles for researches done in natural sciences from the Quran. By inference from the Quran we believe that, in addition to the principles of logic, such as the principle of "non- contradiction", the following principles should be also used as the guidelines for scientific research.

(1) Faith in the Principle of Divine Unity (al-Tawhïd)

According to the Quranic Verses, God is the only Creator and Ruler of the whole universe. Everything originates from Him and ends in Him. All creatures praise Allah, as the purpose behind the creation of man was to approach Allah through worshipping Him:

«وما خلقت لجن والانس الاّ لیعبدون» (الذاریات/٥٦)

"And I have not created the jinn and the man except that they would serve Me." (51:56)

Hence, every step one takes should be aimed at gaining His consent and approaching oneself to the Almighty. The search for the discovery of nature is no exception to this rule. Observance of the grandeur in the Divine deeds, and making use of the possibilities therein for man to attain the eternal happiness should be given priority.

The Quran does not approve of such cognitions which aim at nothing except satisfying one's own curiosity. On the way to understanding of nature, one should not busy oneself with the means and forget the ultimate End. If the researcher realises that God is Infinite in all respects, his attention to this infinite source keeps him moving on without hindrance, and he will be able to find more and more about the magnificence of the creation. This is the surest way of attaining proximity

to the Creator of the Universe:

The understanding of nature should lead us along the road covered by Prophet Ibrähïm, i.e. to commence from the beginning of the string of causes and reach the End — the Lord of the Universe.

«فلما جن عليه الليل رأى كوكبا قال هذا ربي فلما افل قال لااحب الافلين. فلما رأى القمر بازغا قال هذا ربي فلما افل قال لئن لم يهدني ربي لاكونن من القوم الضالين. فلما رأى الشمس بازغة قال هذا ربي هذا اكبر، فلما افلت قال يا قوم اني بريء مما تشركون. انى وجهت وجهي للذي فطر السموات والارض حنيفا وما انا من المشركين» (الانعام/٧٦ــ٧٩)

"So when the night over- shadowed him, he saw a star, said he: 'Is this my Lord? So when it set, he said: I do not love the setting ones.' Then when he saw the moon rising, he said; 'Is this my Lord?' So when it set, he said: 'if my Lord had not guided me I should certainly be of the erring people.' Then when he saw the sun rising, he said: 'Is this my Lord? Is this the greatest? So when it set, he said: 'O my people! Surely I am clear of what you set up (with Allah). Surely I have turned myself, being upright, wholly to Him who originated the heavens and the earth, and I am not of the polytheists'."

(6:76-79)

As a result, Ibrähïm (AS) was led to see the spiritual dimension of the heavens and the earth:

«وكذلك نرى ابراهيم ملكوت السموات والارض وليكون من الموقنين» (الانعام/٧٥)

"And thus did We show Ibrahim the spiritual dimension of the heavens and the earth and that he might be of those who are sure." (6:75)

And this is the way which all researchers have been

invited to follow:

«اولم ينظروا في ملكوت السموات والارض وماخلق الله من شيء...» (الاعراف/١٨٥)

"Do they not consider the spiritual dimension of the heavens and the earth and whatever things Allah has created."
(7:185)

A firm belief in monotheism arms the rescarcher with a comprehensive view of nature, and he no more sees it as a bundle of isolated pieces; rather, he observes their interrelations and their common origin. He sees a unity behind this multiplicity. Experiences of the past generations show that the scholars in the past always endeavoured to find a model according to which they could describe the whole nature. The Greeks had their designs for the explanation of the whole universe. In the Islamic world, too, different schools tried in different ways to discover a pattern for relating together various components of nature.

After the Renaissance, Newton tried to explain the celestial and terrestrial movements by the help of a series of laws. Then Einstein tried to take a step further than Newton in relation to natural issues. In the recent years, too, the main effort of the theoretical physicists has been to derive all the natural forces from one source. In all these stages it is quite apparent that the scientists have been trying to find suitable patterns by the help of which they could interpret the natural phenomena. They have been trying to generalise the result of an experiment carried out on the earth and apply it to the whole physical world.

This character of seeking for unification has been noticed among all scientists (whether materialist or non-materialist), and seems to be intrinsic. The difference between the two groups is that the formers come to stop as soon as they reach the appearance; while the latters seek for the Coordinator of this harmonious system. Here we cite two

glorious verses from the Quran: the first refers to the first group, while the second reveals the opinion of the second:

«وقالوا ماهي الأ حياتنا الدنيا نموت ونحيا وماپهلكنا الأ الدهر وماهم بذلك من علم، ان هم الايخرصون» (الجاثية/٢٤)

1- *"And they say: There is nothing but our life in this world; we live and die and nothing destroys us but time, and they have no knowledge of that; they only conjecture." (45:24)*

«خلق السموات والارض بالحق، تعالى عمّا يشركون» (النحل/٣)

2- *"He created the heavens and the earth in truth, highly exalted be He above what they associate (with Him)." (16:3)*

An important point, with is greatly emphasised in the Quran, is the existence of order in natural phenomena, harmony among the various elements of nature, and a purpose in nature:

«... وكل شيء عنده بمقدار» (الرعد/٨)

"And there is a measure with Him of everything." (13:8)

«... وخلق كل شيء فقدره تقديراً» (الفرقان/٢)

"And who created everything then ordained for it a measure." (25:2)

«ماترى في خلق الرحمن من تفاوت فارجع البصر هل ترى من فطور»

(الملك/٣)

"You see no incongruity in the creation of the Beneficient Allah, then look again, can you see any disorder?" (67:3)

«هوالذي جعل الشمس ضياء والقمر نورا وقدره منازل لتعلموا عدد السنين والحساب. ما خلق الله ذلك إلاّ بالحق. يفصل الآيات لقوم يعلمون»

(يونس/٥)

"He it is Who made the sun a shining brightness and the moon a light, and ordained for it mansions that you might know the computation of years and the reckoning. Allah did not create it but with truth; He makes the signs manifest for a people who know." (10:5)

The existence of this order and design has been pointed out as a sign of monotheism, the unity of the Almighty:

«...لوكان فيها آلهة الا الله لفسدتا...»

(الانبياء/٢٢)

"If there had been in them any gods except Allah, they would both have certainly been in a state of disorder." (21:22)

«... وما كان معه من إله إذاً لذهب كلُّ إله بما خلق ولعلا بعضهم على بعض...»

(المؤمنون/٩١)

"...and never was there with Him any (other) god- in that case would each god have certainly taken away what he created, and some of them would certainly have overpowered others; Glory be to Allah above what they describe!" (23:91)

«صنع الله الذي اتقن كل شيء...»

(النمل/٨٨)

"...the handiwork of Allah who has made everything thoroughly..." (27:88)

Belief in this principle is an important factor in encouraging scholars in their discovery of the laws of nature. In principle, any attempt to discover inter- relations in various aspects of nature without admitting order would look futile, as it would not acquire a universal validity but would remain a local and temporary one.

A belief in this principle makes us realise that wherever we failed to find the order in a natural phenomenon during our study, it would be due to the insufficiency of our knowledge rather than the disorder or rule of chance in nature. During the early years of the second quarter of the twentieth century, when quantum mechanics was appearing, some of the pioneers of the theoretical physics rejected the idea of the existence of order in the atomic domain. Einstein, though unable to present a successful theory against it, was able to reject it through relying on the principle of order in nature. In his letter to Born in December 1926 he wrote:[59]

"Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us any closer to the secret of the "old one". I, at any rate, am convinced that he is not playing at dice."

In another letter to Born in September 1944 he wrote:[59]

"We have become Antipodean in our scientific expectations. You believe in the God who plays dice, and I in complete law and order in a world which objectively exists, and which I, in a wildly speculative way, am trying to capture. I firmly believe, but I hope that someone will discover a more realistic way, or rather a more tangible basis than it has been my lot to find. Even the great initial success of the quantum theory does not make me believe in the fundamental dice-game, although I am well aware that our younger colleagues interpret this as a consequence of senility. No doubt the day will come when we will see whose instinctive attitude was the correct one."

Despite their disbelief in monotheism, some philosophers believe in the existence of order in nature. But from our point of view, order, unity, and co-ordination in nature can only be accounted for through the principle of monotheism (God's Oneness.)

Another conclusion drawn from the principle of monotheism is that the researcher, by observing the relation between the various aspects of nature, finds a unity among different branches of science and considers every one of them as a description of one dimension of the whole reality, and, therefore, does not reject any of them on the ground of his own unfamiliarity with it.

2- Belief in the Reality of the External World:

From the Quranic viewpoint, there is a real external world, independent of our mind:

«وفي الارض آيات للموقنين وفي انفسكم افلا تبصرون»

(الذاريات/٢٠—٢١)

"And in the earth there are signs for those who are sure, and in your own souls (too): Will you not then see?" (51:20-21)

«لخلق السموات والأرض أكبر من خلق الناس ولكن أكثر الناس لايعلمون»

(المؤمن/٥٧)

"Certainly the creation of the heavens and the earth is greater than the creation of the men, but most people do not know." (40:57)

«سبحان الذي خلق الازواج كلها مما تنبت الارض ومن انفسهم ومما لايعلمون»

(يس/٣٦)

"Glory be to Him Who created pairs of all things, of what the earth grows, and of their kind and of what they do not know." (36:36)

«الذي جعل لكم الارض مهدا وجعل لكم فيها سبلا لعلكم تهتدون... والذي خلق الازواج كلها وجعل لكم من الفلك والانعام ماتركبون»

(الزخرف/١٠-١٢)

"He Who made the earth a resting place for you, and made in it ways for you that you may go aright: And He Who created pairs of all things, and made for you of the ships and the cattle what you ride on." (43:10-12)

«والله اخرجكم من بطون امهاتكم لا تعلمون شيئا وجعل لكم السمع والابصار والافئدة...»

(النحل/٧٨)

"And Allah has brought you forth from the wombs of your mothers -you did not know anything- and He gave you the hearing and the sight and hearts..." (16:78)

The verses like:

«وتحسبهم ايقاظا وهم رقود ونقلبهم ذات اليمين وذات الشمال وكلبهم باسط ذراعيه بالوصيد. لو اطلعت عليهم لوليت منهم فرارا ولملئت منهم رعبا»

(الكهف/١٨)

"And you might think awake while they were asleep, and We turned them about to the right and to the left, while their dog (lay) outstretching its paws at the entrance; if you looked at them you would certainly turn back from them in flight, and you would certainly be filled with awe because of them." (18:18)

«وترى الجبال تحسبها جامدة وهي تمر مر السحاب»

(النحل/٨٨)

"And you see the mountains, you think them to be sailed, and they shall pass away as the passing away of the cloud." (27:88)

«وما يتبع اكثرهم الاظنا. ان الظن لايغني من الحق شيئا...»

(يونس/٣٦)

"And most of them do not follow (anything) but conjecture; surely conjecture will not avail against the truth." (10:36)

These verses indicate that there exist other realities other than and independent of our minds. If our mental image of a certain objects does not correspond with the external reality, our mental image is not more than a fancy or imagination, which cannot lead us to reality.

Moreover, had there not been an external world, the Quran would not have so emphatically recommended the study of nature:

«قل سيروا في الارض فانظروا كيف بدأ الخلق...»

(العنكبوت/٢٠)

"Say: travel in the earth and see how He makes the first creation..." (29:20)

«قل انظروا ماذا في السموات والارض...»

(يونس/١٠١)

"Say: Look and see what there are in the heaven and the earth..."

«اولم ينظروا في ملكوت السموات والارض وما خلق الله من شيء...»

(الاعراف/١٨٥)

"Do they not consider the spiritual dimension of the heavens and the earth and whatever things Allah has created."

(7:185)

Belief in the reality of the external world is the basis of all researches in empirical sciences, and without it any scientific research would be only a mental exercise. As Einstein puts it in his commemorative paper (1431) on Maxwell:[60]

"The belief in an external world independent of the perceiving subject is the basis of all natural sciences."

3- Faith in Supra-physical Reality and Limitation of Human Knowledge.

We learn from the Quran: certain principles in this regard, which are discussed below.

(a)- Human knowledge is limited:

«وما اوتيتم من العلم الاقليلا»

(الاسراء/٨٥)

"...And you are not given aught of knowledge but a little."
(17:85)

«سبحان الذي خلق الازواج كلها مما تنبت الارض ومن أنفسهم ومما لايعلمون»

(يس/٣٦)

"Glory be to Him who created pairs of all things of what the earth grows, and of their kind and of what they do not know." (36:36)

«والخيل والبغال والحمير تركبوها وخلق مالا تعلمون» (النحل/٨)

"And (He made) horses and mules and asses that you might ride upon them and as an ornament; and He creates what you do not know." (16:8)

(b)- There are many things we cannot get through our senses:

«فلا أقسم بما تبصرون وما لا تبصرون»

(الحاقة/٣٨–٣٩)

"I swear by what you see and what you don't see"
(67: 38-49)

«الله الذي رفع السموات بغير عمد ترونها...»

(الرعد/٢)

"Allah is He Who roused the heavens without any pillars that you see, and He is firm in power..." (13:2)

(c)- We should believe in the occult, that is, in supernatural realities:[61]

«ذلك الكتاب لاريب فيه هدى للمتقين الذين يؤمنون بالغيب ويقيمون الصلاة ومما رزقنا هم ينفقون»

(البقرة/٣)

"This book, there is no doubt in it, is a guide to those who guard (against evil). Those who believe in the occult and keep up prayer and spend out of what We have given them." (2:3)

The faith in the limitation of human knowledge and the metaphysical realities lead us to the following corollaries:

1- Not to limit our mental activity to the sensory stage.

2- Never to think that we have discovered everything. Of course, this by no means indicates that man will not be able to discover any of the truths in the world, but we should not claim to have a full understanding of a natural phenomenon at a certain time. Seyyd Qutb in his interpretation of the verse 3 in chapter Al-Baqarah says:[62]

"Faith in the supra- physical is a stage by attaining which man rises above the level of animality -at which perception is confined to the domain of external senses- and reaches the stage of humanity, a much larger and more spacious domain beyond the limited domain of external senses opens up before him. The transference to this new stage brings a radical change in man's view of the reality of the existence in general, and his own self in particular. and he perceives hidden powers in the universe; how, he is greatly affected by a new feeling and can perceive in the creation the Power and Wisdom at work behind it. This transference affects the realities of one's life, because there is a great difference between a person whose life is entrenched in the limited span of sensory perception and the one whose soul and insight take him to the vast kingdom (of higher realities) where he can hear and feel the mysterious music and inspiration gushes out of the depths of his heart. He feels that the extent of the universe is too great for him to comprehend during his short span of life. He realises that beyond the seen and unseen universe of existence, there exists a truth much greater than existence and He is the Creator and the Preserver of it. This truth is not visible to human eye and is not discerned by human wisdom alone.

This feeling (knowledge of the immensity of the unknown) safeguards the limited human faculty of thinking and does not let it go astray and waste itself in the areas for which it has not been created."

4- Belief in the Principle of General Causality

The principle of causality says that every event requires a cause. This principle has two important corrolaries:

(a) **The Principle of Determinism:** Any cause requires an effect, and without a cause it is impossible to have an effect.

(b) **The Principle of Uniformity of Nature:** Similar causes entail similar effects.

These two corrolaries are inseparable from the principle of general causality, and any violation in them will be the violation of the principle of general causality.[63]

After this brief introduction, we want to demonstrate that the Quran admits the principle of general causality:

(a)- In the Quran we have many verses which talk of unchangeable patterns (sunan) of Allah in the Universe:

«سنة من قد ارسلنا قبلك من رسلنا ولاتجد لسنتنا تحويلا»

(الاسراء/٧٧)

"(This is Our) course with regard to those of Our apostles whom We sent before you, and you shall not find a change in our course." (17:77)

«سنة الله في الذين خلوا من قبل ولن تجدلسنة الله تبديلا»

(الاحزاب/٦٢)

"(Such has been) the course of Allah with respect to those who have gone before; and you shall not find any change in the course of Allah." (33:62)

«ما كان على النبي من حرج فيما فرض الله له، سنة الله في الذين خلوامن قبل، وكان امرالله قدرا مقدورا»

(الاحزاب/٣٨)

"There is no harm in the prophet doing that which Allah has ordained for him; such has been the course of Allah with respect to those who have gone before; and the command of Allah is a decree that is made absolute." (33:38)

«يريد الله ليبين لكم ويهديكم سنن الذين من قبلكم»

(النساء/٢٦)

"Allah desires to explain to you, and to guide you into the ways of those before you, and to turn to you (mercifully) and Allah is knowing." (4:26)

We find many examples of these patterns in the Quran itself:

«ان الله لايغير ما بقوم حتى يغيروا ما بانفسهم»

(الرعد/١١)

"Most surely Allah does not change the condition of a people until they change their own condition." (13:11)

«واذا اردنا ان نهلك قرية امرنا مترفيها ففسقوا فيها...»

(الاسراء/١٦)

"And when We wish to destroy a town, we send Our commandment to the people of it who lead easy lives; but they transgress therein..." So We destroy it with utter destruction." (17:16)

«وعدالله الذين آمنوا منكم وعملوا الصالحات ليستخلفنّهم في الارض...»

(النور/٥٥)

"Allah has promised to those of you who believe and do good that We most certainly make them rulers in the earth."

«ولاتهنوا ولاتحزنوا وانتم الاعلون ان كنتم مؤمنين...»

(آل عمران/١٣٩)

"And be not infirm, and be not grieving, and you shall have the upper hand if you are believers." (3:139)

«وما كان ربك ليهلك القرى بظلم واهلها مصلحون»

(هود/١١٧)

"And it did not beseem your Lord to have destroyed the towns tyrannously, while their people acted well." (11:117)

«... فأما الزبد فيذهب جفاء واما ما ينفع الناس فيمكث في الارض...»

(الرعد/١٧)

"...then as for the scum, it passes away as a worthless thing; and as for that which profits the people, it tarries in the earth..."

«... ولا يحيق المكر السيء الا باهله فهل ينظرون الا سنة الاولين، فلن تجد لسنة الله تبديلا ولن تجد لسنة الله تحويلا»

(فاطر/٤٣)

"...and the evil plans shall not beset any save the authors of it. Then should they wait for aught except the way of the former people? For you shall not find any alteration in the course of Allah; and you shall not find any change in the course of Allah." (35:43)

b) Some of the Quranic verses indicate that both the creation and the course of events in nature follow a certain measure, and every natural being has a definite and precise life span:

«الشمس والقمر بحسبان»

(الرحمن/٥)

"The sun and the moon follow a reckoning. (55:5)

«وإن من شيء الاعنده خزائنه ومانتزله الا بقدر معلوم»

(الحجر/٣)

"And there is not a thing but with Us are the treasures of it, and We do not send it down but in a knowing measure." (15:21)

«وكل شيء عنده بمقدار»

(الرعد/٨)

"...and there is a measure with Him of everything." (13:8)

«أولم يتفكروا في انفسهم ما خلق الله السموات والارض وما بينهما الابالحق واجل مسمى وان كثيرا من الناس بلقاء ربهم لكافرون»

(الروم/٨)

"Do they not reflect within themselves: Allah did not create the heavens and the earth and what is between them but with truth, and (for) an appointed term? And most surely most of the people are deniers of the meeting of their Lord?"

c) Some verses mention the mechanism and the special course of certain events in nature:

«ولقد خلقنا الانسان من سلالة من طين، ثم جعلناه نطفة في قرار كمين...»

(المؤمنون/١٢-١٣)

"And certainly We created man of an extract of clay, then we made a small life- germ in a firm resting place." (23:12-13)

«وانزل من السماء ماءً فاخرج به من الثمرات رزقا لكم...»

(البقرة/٢٢)

And (Who) sends down rain from the cloud, then brings forth with it subsistance for you." (2:22)

«قال ابراهيم: فان الله يأتي بالشمس من المشرق فأت بها من المغرب، فبهت الذي كفر...»

(البقرة/٢٥٨)

"...Ibrahim said: So surely Allah causes the sun to rise from the east. Then make it rise from the west. Thus he who disbelieved was confounded." (2:258)

«والشمس تجري لمستقرها ذلك تقدير العزيز الحكيم. والقمر قدرناه منازل حتى عاد كالعرجون القديم. لاالشمس ينبغي لها ان تدرك القمر ولا الليل سابق النهار وكل في فلك يسبحون»

(يس/٣٨—٤٠)

"And the sun runs on to a term appointed for it, that is the ordinance of the mighty, the knowing. And (as for) the moon, We have ordained for it stages till it becomes again as an old dry palm branch. Neither is it allowable to the sun that it should overtake the moon, nor can the night outstrip the day; and all of them float through space." (36:38-40)

d) Some verses talk of the role of certain intermediary causes in the occurence of some events:

«وارسل عليهم طيرا ابابيل ترميهم بحجارة من سجيل»

(الفيل/٣—٤)

"And sent down (to prey) upon them birds in flocks, casting them against stones of baked clay." (105:3-4)

«والله انزل من السماء ماءً فأحيا به الارض بعد موتها...»

(النحل/٦٥)

"And Allah has sent down water from the cloud and therewith given life to the earth after its death." (16:65)

«ومن ثمرات النخيل والاعناب تتخذون منه سكرا ورزقاً حسنا...»

(النحل/٦٧)

"And of the fruits of the palms and the grapes - you obtain from them intoxication and goodly provision." (16:67)

«وارسلنا الرياح لواقح...»

(الحجر/٢٢)

"And We send the winds fertilizing..." (15:22)

«قاتلوهم يعذبهم الله بايديكم ويخزهم وينصركم عليهم ويشف صدور قوم مؤمنين».

(التوبة/١٤)

"Fight them; Allah will punish them by your hands and bring them to disgrace, and assist you against them and heal the hearts of a believing people."

These verses show that certain definite laws rule over the universe. This however, is meaningful only if the principle of general causality is valid. In this case every event stands in its definite place, i.e. every event appears under definite conditions and at a definite time and place. This does not imply that events are independent of the Almighty's Will and order, but it means that in this system, everything is realised by God's Will, but through a special channel. Verses of the following type confirm this view:

«والبلد الطيب يخرج نباته باذن ربه والذي خبث لايخرج الا نكدا...»

(الاعراف/٥٨)

"And as for the good land, its vegetation springs forth (abundantly) by the permission of its Lord, and (as for) that which is inferior (its herbage) comes forth but scantly." (7:58)

قدجاء كم من الله نور وكتاب مبين، يهدى به الله من اتبع رضوانه سبل السلام ويخرجهم من الظلمات الى النور باذنه...»

(المائدة/١٥-١٦)

"...Indeed, there has come to you light and a clear book from Allah. With it Allah guides him who will follow His pleasure into the ways of safety and brings them out of utter darkness into light by His will." (5:15-16)

The first verse indicates that although God's Will is necessary for the growth of plants, yet the suitability of the land is also a condition. Not every sort of plant can be raised in every piece of land. With the suitability of the land God makes it possible for the plant to grow.

It can be also deduced from the verses 15-16 of chapter Mä'idah (food) that only those seeking God's consent would enjoy His guidance in the Quran.

Some well- known Muslim theologians, particularly of Asharite school, on the basis of verses like:

«قل الله خالق كل شيء وهوالواحد القهار»

(الرعد/١٦)

"Say: Allah is the Creator of all things, and He is the One, the Supreme." (13:16)

«والله خلقكم وما تعلمون»

(الصافات/٩٦)

"And Allah has created you and what you make." (37:96)

«الا له الخلق والامر»

(الاعراف/٥٤)

"Surely His is the creation and command." (7:54)

«بل لله الامر جميعا»

(الرعد/٣١)

"The commandment is wholly Allah's." (13:31)

«أفرأيتم ماتحرثون. أأنتم تزرعونه ام نحن الزارعون»

(الواقعة/٦٣—٦٤)

"Have you considered what you saw? Is it you that cause it to grow or are We the causes of growth?" (56:63-64)

which attribute creation and governance of the Universe to Allah, and verses like:

«قلنا يانار كوني بردا وسلاما على ابراهيم»

(الانبياء/٦٩)

"We said: O fire! be a comfort and peace to Ibrahim." (21:69)

which are indicative of the possibility of miracles, have rejected the law of causation in the physical world and say that physical means have no role in the realization of a phenomenon. The cause of any occurrence is God's Will, except that it is God's way to create what we call "effect" after what we call "cause", without any relation between them that necessitates the effect to follow the cause. They say: It is not fire which causes the cotton to burn; rather, it is Allah who makes the cotton burn and turns it into ashes; and of course, if God does not want, the fire will not burn the cotton. Al-Ghazzali, a chief representative of Ash'arism, in **"Tahafut al-Falasifah"** says:[64]

"According to us, the connection between what is usually believed to be a cause and what is believed to be an effect is not a necessary connection. In the case of two things which are not identical and the affirmation or negation of one is not implied in the affirmation or negation of the other,

neither the existence, nor the non-existence of the one necessitates the existence or the non-existence of the other. For example, the satisfaction of thirst does not imply drinking, nor satiety, eating, nor burning, contact with fire, nor light, sunrise, nor decapitation, death, nor recovery, taking of medicine, nor evacuation, the taking of a purgative, and so on for all the empirical connections existing in medicine, astronomy, the sciences and the crafts. For the connections in these things are based on a prior power of God to create them in a successive order, though not because this connection is necessary in itself and cannot be disjoined - on the contrary, it is in God's power to create satiety without eating, and death without decapitation, and to let life persist notwithstanding the decapitation, and so on with respect to all connections. The philosophers, however, deny this Possibility and claim that it is impossible to investigate all these innumerable connections would take too long, and so we shall choose one single example, namely the burning of cotton through contact with fire; for we regard it as possible that the contact might occur without burning taking place, and also that the cotton might be changed into ashes without any contact with fire, although the philosophers deny this possibility.

It is God who made the cotton burn and made it ashes either through intermediation of angels or without intermediation. For fire is a dead body which has no action, and what is the proof that it is the agent? Indeed, the philosophers have no other proof than the observation of the occurrence of the burning, when there is contact with fire, but observation proves only a simltaneity, not a causation, and, in reality, there is no other cause but God."

This theory is rooted in the idea that accepting a decisive order in the world would require the denial of God's power. Muslim philosophers reject the Ash'arite view and say:

a) The coincidence of two causes operating on a single

object is impossible only when the two causes operate transversally, whereas the longitudinal operation of two causes on the same object is quite possible.[65] If we believe in the longitudinal system of causes, we could relate every occurrence to God; because He gives existence. This emanation, however, takes place through special channels. That is the reason why God attributes the regulating of affairs sometimes to Himself and sometimes to the angels:

«يدبر الامر من السماء الى الارض...»

(السجدة

""He regulates the affairs from the heaven to the earth..." (32:5)

«فالمدبرات امراء

(النازعات/٥)

"...By those who regulate an affair..." (79:5)

He also attributes taking of souls to Himself or to angels:

«الله يتوفى الانفس حين موتها...»

(الزمر/٤٢)

"Allah takes the souls at the time of their death." (39:42)

«قل يتوفيكم ملك الموت الذي وكل بكم...»

(السجدة/١١)

"Say: the angel of death who is given charge of you shall

cause you to die." (32:11)

b) In the case of material bodies, what is commonly called "cause" is not the efficient cause but it is an intermediary or preparing cause which prepares the ground for God's bounty. These causes are materialistic and preparatory requirements for an event to occur, and are sometimes interpreted as the transversal system of causes. So, one can say that God is the cause for everything, but he makes everything under certain terms and through certain means; and of course, all these means and ways are the objects made by the Almighty Himself. Sadr al-Dīn Shīrazī explains Muslīm philosophers' view in the following way:[66]

"Another group of philosophers and some elite among our Imamiah scholars say that objects vary in their acceptance of existence from the Origin. Some do not yield to existence unless another being precedes them, in the same way that accident should follow substance. Thus the Creator, whose power is unlimited, grants the existence according to the possibilities through a particular order and in consideration of its various capabilities. Some come directly from Him, some through an intermediary or interdiaries. In the last form, nothing can come into existence unless its means and pre-requisites come into reality. God Himself is the Cause without a cause. Requirements for existence are not the result of deficiency in the Almighty's power, but due to weakness in the receiver of emanation. How can one imagine any need or deficiency in the Creator, while means and ways are all originated from Him? Therefore, the Glorious God does not need any help in the creation of anything."

Thus, verses of the following type:

«افرايتم ما تحرثون أأنتم تزرعونه ام نحن الزارعون * لونشاء لجعلناه حطاما فظلتم تفكهون... أفرايتم الماء الذي تشربون أأنتم انزلتموه من المزن ام نحن المنزلون لونشاء جعلناه اجاجا فلولا تشكرون»

(الواقعة/٦٢—٧٠)

"Have you considered what you saw? Is it you that cause it to grow, or are We the cause of growth? If We pleased, We should have certainly made it broken down into pieces, then would you begin to lament: Surely We are burdened with debt: Nay! We are deprived. Have you considered the water which you drink? Is it you that send it down from the clouds, or are We the senders? If We pleased, We would have made it saltish; why do you not then give thanks?" (56:63-70)

which have been used as the basis of reasoning by Imam Fakhr al-Din Razi[67] in the rejection of the system of cause and effect do not indicate the negation of intermediary means in the occurence of natural phenomena, but they indicate that we should not stop at the channels of emanation and should not remain unaware of the main cause who is the Commander (Ruler) of the whole universe, life giver to all, and He who is at the head of the longitudinal system of all causes, nor should we think that these are self-activating. As martyred Dr.Beheshti puts it:[68]

"The fact is that the Holy Quran wants to guide man from this end of the cord, i.e. sensibles, to the other end of the cord which is Allah. It wants that man does not stop at intermediary causes and fail in reaching the Origin. In all of the verses there is a voice which says: 'Be alert', while you are studying this world, don't slip into a ditch; take care not to leave the cord; do not drown yourself in the world of matter or contingents... It is true that for agriculture you make preparations, which you should, but do not imagine that the cord is fully in your hand. Do you not see that at times you find a green sapling suddenly dies and fades despite the utmost care and with all the modern and old means that you employ to make it grow?; thus you, with all the means that you have at your disposal, are too insignificant to have the end of the cord. It is true that your drinking water comes down from the clouds, but do not let your keen eye to linger on the cloud saying that the water in the cloud is pure. The Quran says: It may rain, but the rain might be so badly

contaminated or bitter and di asteful that one could not drink a drop of it; so the end of the cord of your drinking water is not in the hand of the loud, but in the hand of the Wise Omnipotent, Who has c ated clouds and hundreds of other agents which work un er his command and furnish men with fresh, tasty water."

In the case of miracles, too, considering the invariability of Divine patterns in nature, we do not find it necessary to look for the exceptions in the laws of nature; because if we find a deviation from a natural law, this does not necessarily means that the law is not correct or that the law of Causality is violated. Because it is possible to make one law ineffective by the help of another law in the universe. If a body falls because of the gravity, this force may be neutralised by the use of another force. Therefore, on the observance of a suspended body in the air, we should not immediately suppose that there is no such a law as gravitation; rather, we can assume that there is another force besides the force of gravity. Martyred Mutahhari puts it:[69]

"Neither do the laws of creation yield themselves to exceptions, nor are miracles exceptional deeds in the laws of creation. If we observe certain changes in the patterns of the universe, it is because of the interference of other patterns or laws, which, too, have general validity under their own special conditions. That is, one law does not change without the effect of another law. In the universe, all the laws, courses and patterns are invariable. If a dead (man) comes back to life, it follows a law of its own; if a son is born without having a father- as in the case of 'Isä bin Maryam, that, too, is not against Allah's course or the law of the universe; the problem is that man does not know all the patterns and laws of the universe, and what he knows as a law, in many cases has the appearance of a law and is not a real one."

After the appearance of the quantum theory in physics, and the presentation of the principle of uncertainty by W.Heisenberg in the early years of the second quarter of the present century, some of the founders of this theory denied

the existence of causal system in the world of particles and permitted the rejection of the principle of uniformity of nature and the principle of determinism, and gave a statistical status to the laws of microphysics. Most of the physicists, with the exception of some prominent ones like Planck and Einstein, raised their voices in favour of the new theory and more or less accepted its orthodox interpretation, a situation which is still going on, although the lapse of time has increased the number of opponents.

Einstein and his colleagues rejected this theory because they could not accept that probabilities were ruling over the universe. From their viewpoint, the objective of physics should be to explain all natural phenomena according to absolute laws. The reason why we stick to statistical laws is that we are either ignorant of absolute laws which are the basis of statistical laws, or dealing with innumerable particles make us stick to statistical mathematics for the sake of simplification. As Einstein put it in his lecture in 1933:[70]

"I cannot but confess that I attach only a transitory importance to this interpretation. I still believe in the possibility of a model of reality — that is to say, of a theory which represents things themselves and not merely the probability of their occurrence."

In a letter addressed to Born in April 1924 Einstein wrote:[59]

"...I should not want to be forced into abandoning strict causality without defending it more strongly than I have so far. I find the idea quite intolerable that an electron exposed to radiation should choose of its own free will, not only its moment to jump off, but also its direction. In that case, I would rather be a cobbler, or even an employee in a gaming-house, than a physicist. Certainly my attempts to give tangible form to the quanta have foundered again and again, but I am far from giving up hope. And even if it never works there is always that consolation that this lack of success is entirely mine."

In recent years we come across some Muslim scholars[71] who have revived the forsaken theory of the Muslim theologians, citing the quantum theory as a proof for their claims. To answer them, we are going to quote Dirak, who was one of the founders of quantum physics. In a recent paper (1979) he said:[72]

"It seems clear that the present quantum mechanics is not in its final form. Some further changes will be needed, just about as drastic as the changes which one made in passing from Bohr's orbits to quantum mechanics. Some day a new relativistic quantum mechanics will be discovered in which we don't have these infinities occurring at all. It might very well be that the new quantum mechanics will have determinism in the way that Einstein wanted. This determinism will be introduced only at the expense of abandoning some other preconceptions which physicists now hold, and which it is not sensible to try to get at now.

So under these conditions I think it is very likely, or at any rate quite possible, that in the long run Einstein will turn out to be correct, even though for the time being, physicists have to accept the Bohr probability interpretation —— especially if they have examinations in front of them."

Finally, in confuting those who deny the validity of the principle of causality in the atomic and sub-atomic domain, we say:

a) If we deny the validity of the principle of causality in the atomic and sub-atomic world, this would mean defacing this principle in relation to the whole world, because causality brings the whole world together. As Sheikh Shabistarí puts it:

اگر یک ذرّه را برگیری از جای

همه عالم خلل یابد سرابای

"If you remove a single particle out of its place, the whole world tumbles down."

b) The generalisation of the results of a limited number of experiments in the form of general laws and scientific theories become meaningful only in the light of the principle of causality. Because in accepting something as a law we also accept that:

(i) Every effect has a cause

(ii) The relation between cause and effect is indispensable

(iii) Similar causes entail similar effects

In practice, no one can be sure of considering all the relevant factors and parameters. Therefore, generalization cannot be of absolute validity. This limitation, however, arises from the deficiency in our information. In any case, we believe that faith in the existence of absolute laws can be meaningful only if the principle of uniformity of nature is valid. As Planck puts it:[73]

"Of course it may be said that the law of causality is only after all a hypothesis. If it be a hypothesis, it is not a hypothesis like most of the others, but it is a fundamental hypothesis because it is the postulate which is necessary to give sense and meaning to the application of all hypotheses in scientific research. This is because any hypothesis which indicates a definite rule presupposes the validity of the principle of causation."

c) Should the Principle of causality turn out to be invalid, nothing would be the result of a proof, because the proof is the cause of our knowledge of the desired result, and if the tie between proof and result be non-essential, the proof may not end in the result. In such a case nothing would be the result of a proof; and any proof might lead to any result; and there would be no difference between producing a proof and not producing it. That is why even those who reject the principle of causality accept it implicitly, because they admit that their proof will undermine our faith in the principle of causality.[74]

d) As Martyred Professor Murtadä Murtahharï and Martyred Ayatullah Muhammad Baqir Sadr have pointed

out,[75] the impossibility of prediction in atomic domain arises from our ignorance about the deterministic laws governing atomic phenomena rather than ineffectiveness of the principle of causality and its corrolaries in the atomic world. This in itself is due either to the deficiency in the means of experimentation or due to the immeasurability of the effects of the experimentalist on the experiments. In any case, we should note that our failure in the discovery of a cause does not mean its non-existence, and we have no proof to say that modern science has discovered all the factors therein. As Einstein puts it.[76]

"Therefore, the fact that in science we have to be content with an incomplete picture of the physical universe is not due to the nature of the universe itself but rather to us."

In short, the denial of the principle of causality is the denial of scientific laws as well as the negation of reasoning. Science has to accept the principle of causality with all its inseparable corrolaries, so that its existence could be meaningful.

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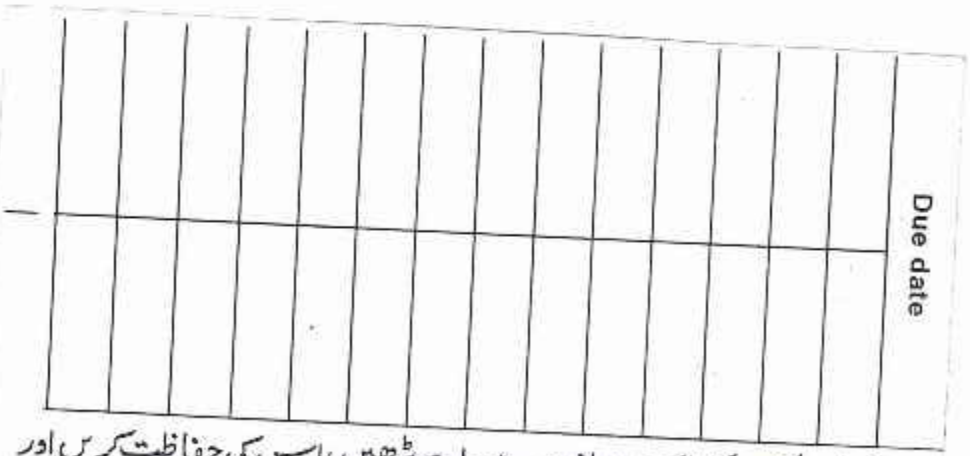

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